OCTOBER 6, 1934

Railway Age

FOUNDED IN 1856

BYERS WROUGHT IRON...

● 7000 square feet of ½" Byers Genuine Wrought Iron Plates and a quantity of Byers 4"x 4" Angles were used for the five track troughs on this ballast type bridge carrying the Chicago, Milwaukee, St. Paul & Pacific Railroad tracks.

Goes on ANOTHER BRIDGE JOB

THE ballast type design of bridge reduces floor depth and cushions shock. And the use of Byers Wrought Iron Deck Plates reduces maintenance and prolongs the life of the bridge structure.

Wrought iron is being used today for more bridge protection work than ever before. This is especially true of bridges subjected to the corrosion of brine drippings and sulphur-laden blasts. And for this type of service wrought iron holds an enviable record of corrosion resistance.

If you are planning any bridge construction or maintenance work, give careful consideration to wrought iron for cover plates, deck plates, trough plates, water troughs, blast plates, and bridge railings, and also for bridge drainage and downspouts. We will be glad to furnish you prints of sketches showing typical applications of wrought iron in bridge construction, also photos and comparative data on life of materials in bridge construction. Ask a Byers Engineer or write our Engineering Service Department.

A. M. Byers Co., Est. 1864. Pittsburgh, Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Los Angeles.

BYERS GENUINE WROUGHT IRON PRODUCTS

PIPE • WELDING FITTINGS • RIVETS • SPECIAL BENDING PIPE • BAR IRON
PLATES • SHEETS • CULVERTS • FORGING BILLETS • STRUCTURALS

STANDARD of QUALITY for 70 YEARS • • • TODAY BETTER THAN EVER

New Locomotives

now being built for

NORTHERN PACIFIC . . . 10 locomotives, 4-8-4 type

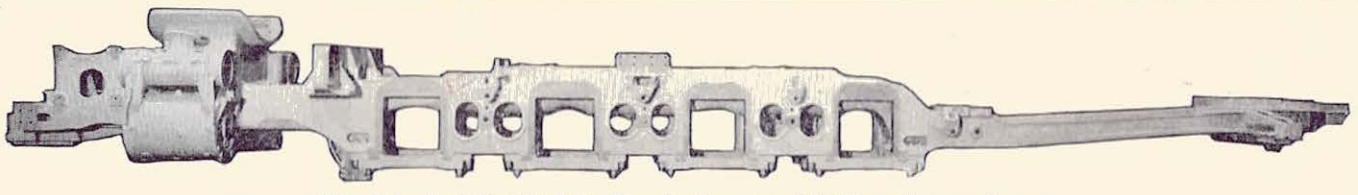
LACKAWANNA . . . . . 20 locomotives, 4-8-4 type

LEHIGH VALLEY . . . . . 5 locomotives, 4-8-4 type

BOSTON & MAINE . . . . 5 locomotives, 4-8-2 type

will all have

COMMONWEALTH BEDS



One of the Cast Steel Beds for New Lackawanna 4-8-4 Type Locomotives with Integral Cylinders, Rear Cylinder Heads, and Air Reservoi

Commonwealth Beds have these Proven Advantages:

The necessary strong foundation for modern efficient locomotives

•

Permanent true alignment of frame structure, cylinders and moving parts

•

Greatly reduced locomotive repair costs

•

Increased serviceability of locomotive

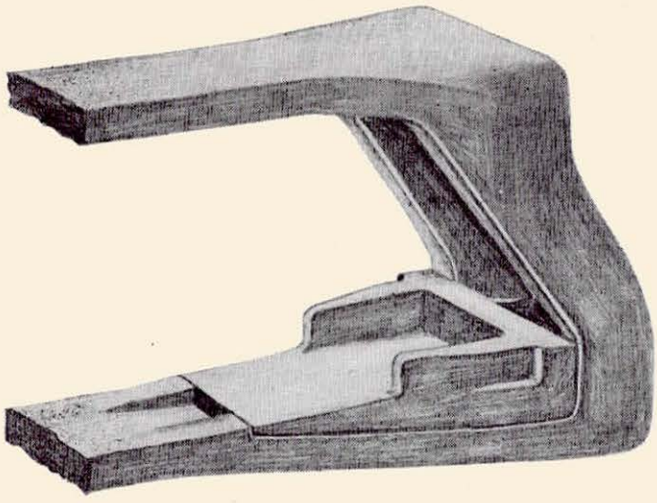
GENERAL STEEL CASTINGS CORPORATION

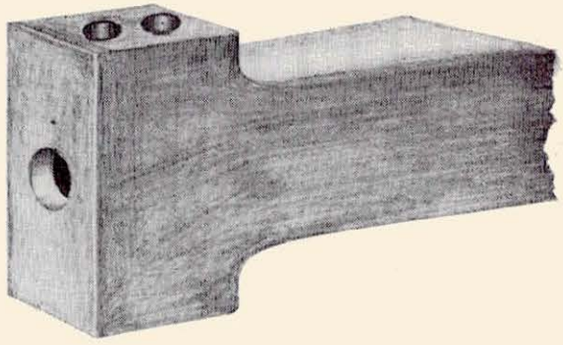
EDDYSTONE, PA. COMMONWEALTH PRODUCTS GRANITE CITY, ILL.

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter. January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

the ***PERFECT YOKE***

FOR





OLD COUPLERS

WIDELY USED

No burning or chipping necessary when applying.

Simply slide the coupler into the yoke, insert the key and pull coupler forward to position.

MINER CAST STEEL YOKE

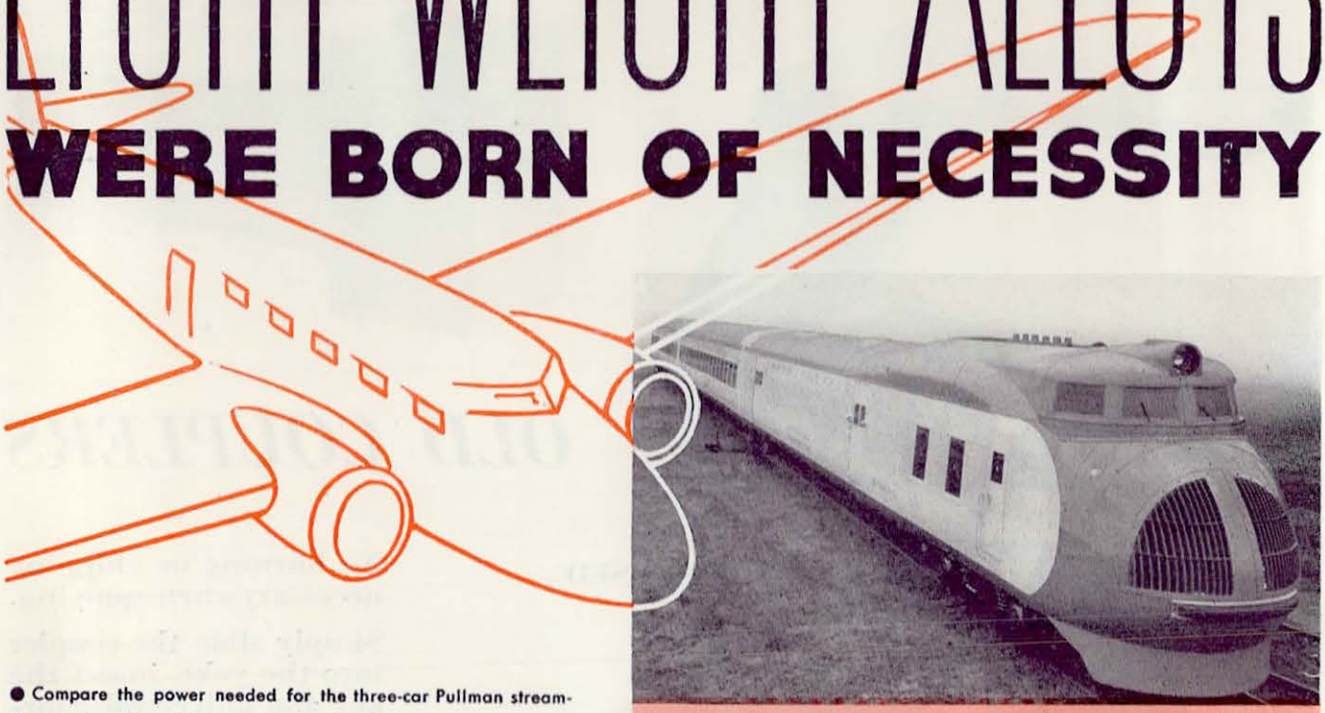
For
8-1/2″ and 9-1/8″ Coupler Butts
24-5/8″ and 18-1/2″ Gear Pockets

Made of highest quality heat-treated steel

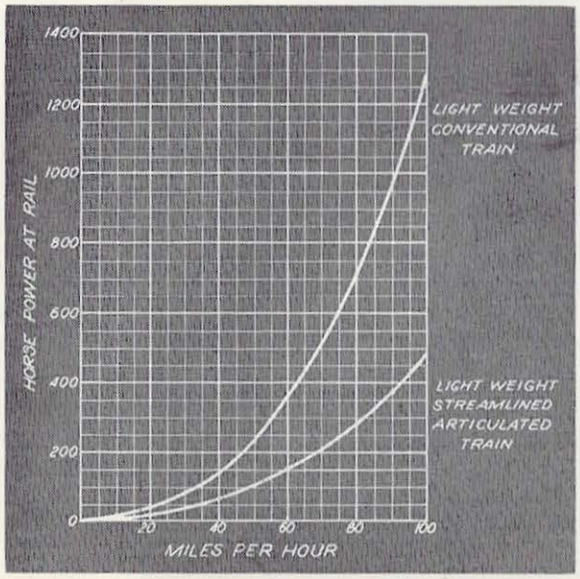
(Ask for descriptive folder)

W. H. MINER, INC., CHICAGO

LIGHT WEIGHT ALLOYS
WERE BORN OF NECESSITY



● Compare the power needed for the three-car Pullman streamlined train with a similar conventional train . . . both at speeds of 90 m. p. h. The conventional train requires 975 H. P. at the rail. The streamlined train requires only 375 H. P. The saving is 600 H. P.



● The newer alloys were born of the requirements of the airplane . . . the necessity for light weight combined with strength. They are developments that have become available for railroad use only recently.

The streamlined train is indebted to the airplane, not only for light weight, but for recognition of the fact that air resistance is a power-consuming factor at high speeds.

Economical operation—the saving of power—therefore is an important reason for the increasing trend toward the new streamlined trains. To economical operation, add the interest and patronage of the public. The combination makes the streamlined train a powerful factor in increasing passenger traffic and in lowering operating costs.

PULLMAN
CAR & MANUFACTURING CORPORATION
Chicago • San Francisco • Washington • Birmingham

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 97 October 6, 1934 No. 14

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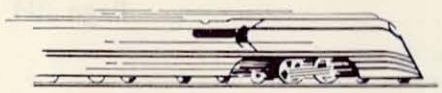
GREATER SPEEDS *hasten* RAILROAD RECOVERY



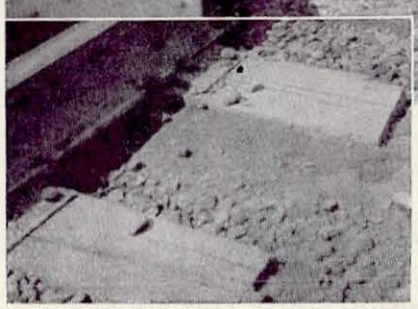
TRAFFIC everywhere is being speeded up to give improved service. Record runs across the country and elsewhere are helping the railroads regain their rightful place in the transportation world.

But greater speeds demand better track, and better track requires dependable drainage.

Keeping the roadbed dry and firm the year 'round is the special duty of Armco Perforated Pipe. As evidence, look at the roads that have "invested" in this sturdy, durable subdrainage pipe and have come through the "lean years" with their tracks in fine condition, despite reduced maintenance.

Let an experienced Armco engineer show you complete data on the actual savings which have resulted from many such jobs.

CALL IN AN ARMCO ENGINEER



Installing Armco Perforated Pipe for subdrainage between and under tracks on viaduct over the Old National Road in Indiana. Inset at left shows how pumping action has brought mud and water to the top of ballast — the reason for excess maintenance.

ARMCO MEANS REDUCED MAINTENANCE

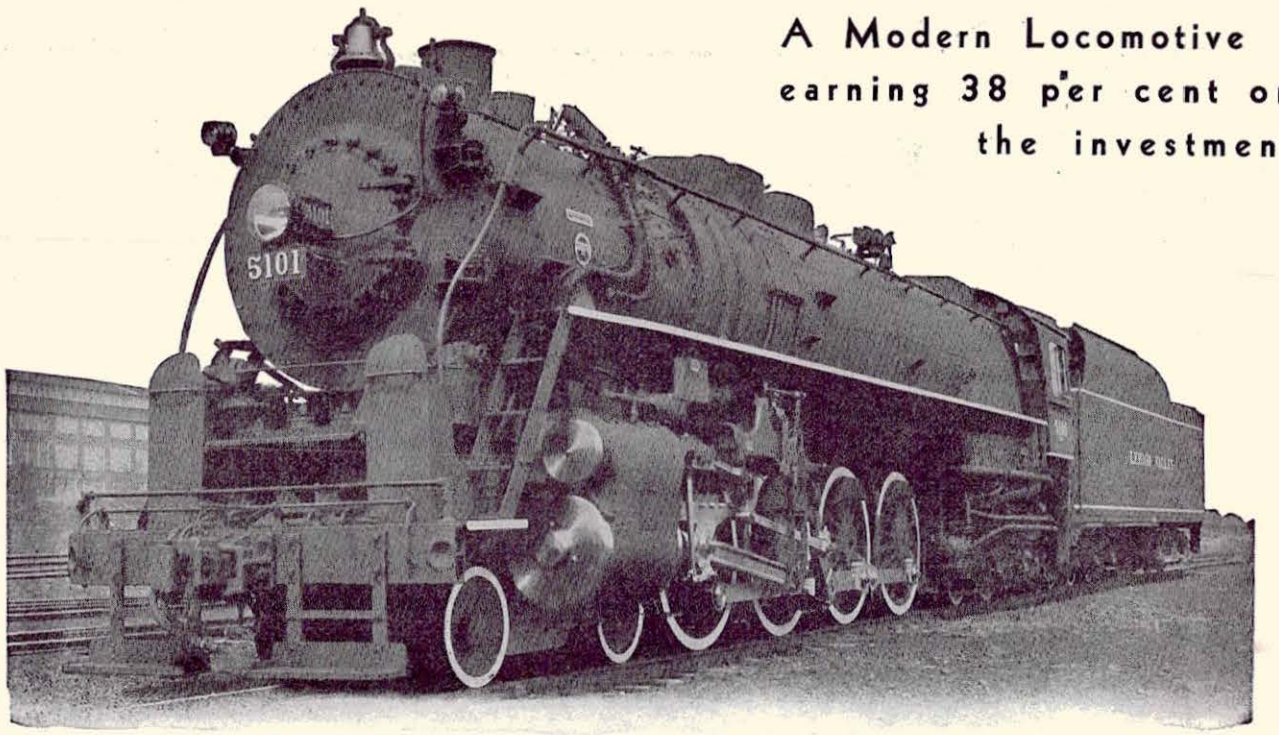
ARMCO PERFORATED PIPE

INGOT IRON RAILWAY PRODUCTS COMPANY

Middletown, Ohio Berkeley, Calif.

Philadelphia St. Louis Salt Lake City
Los Angeles Minneapolis Houston Portland
Atlanta Denver Chicago Dallas
El Paso Spokane

(Member of the Armco Culvert Mfrs. Assn.)



A Modern Locomotive earning 38 per cent on the investment

SELF-LIQUIDATING—

describes the investment in new power to replace locomotives that are obsolete.

Modern locomotives, suitably designed for the work to be done, show savings which will return their purchase price and more within relatively few years.

There is nothing self-liquidating about the investment of the same amount in the repairs and excess operating expenses necessary to keep obsolete locomotives on the rails.

Locomotive development has been greater during the past twelve years than during any similar period in history.

Locomotives antedating that period, even when rebuilt, can never equal the economical performance of today's locomotives.

It takes Modern Locomotives to make money these days!

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

G-R-S RETARDERS

A true Scotsman recognizes economy instinctively; thrift is acquired through comparison. Car Retarders, since their first installation in 1924, have proven economical. Successive installations have shown as high as 69 per cent annual return on capital investment. The economy of retarder equipped classification yards is firmly established.

G-R-S Type B Car Retarders exemplify Scotch thrift with lower operating and maintenance costs. All-Electric Retarders require only one source of power. Conversion and transmission losses are minimized. Power is used only in proportion to the work done, that is, to move the shoes to or away from a retarding position. No energy is required to hold the shoes in a retarding position.

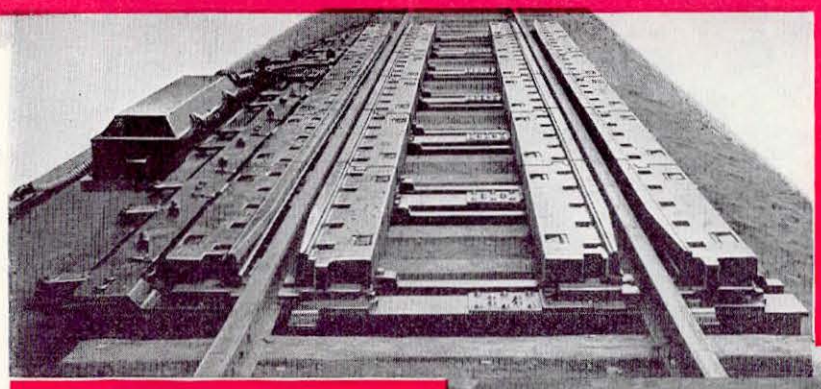
Rugged construction and service-proven design eliminate undue wear. All parts are accessible, ties are easily tamped and maintenance costs are low.

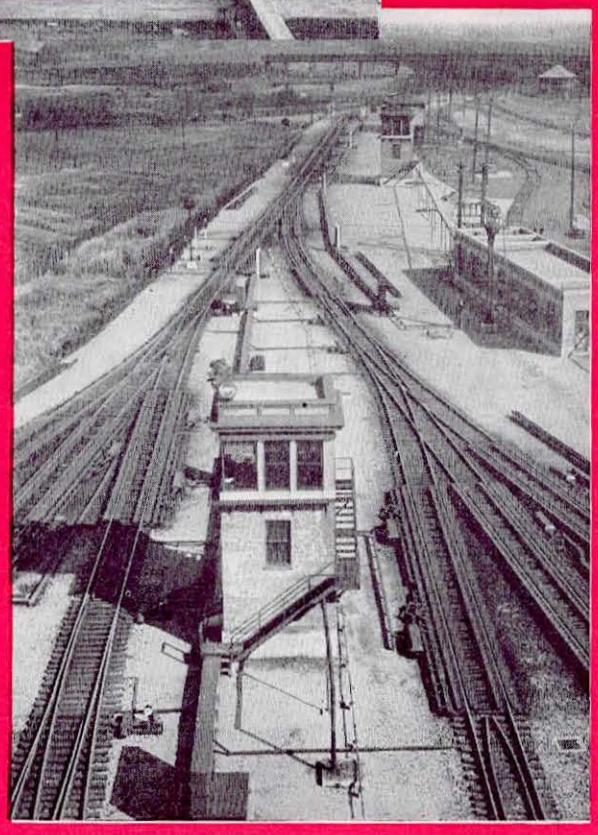
When considering the economy of retarder equipped car classification yards, consider further the thrift of all-electric operation. Our nearest district office will furnish additional information on request without obligation.

GENERAL RAILWAY

New York Chicago ROCHESTER,
Montreal London Paris Tokyo

OFFER SCOTTISH THRIFT



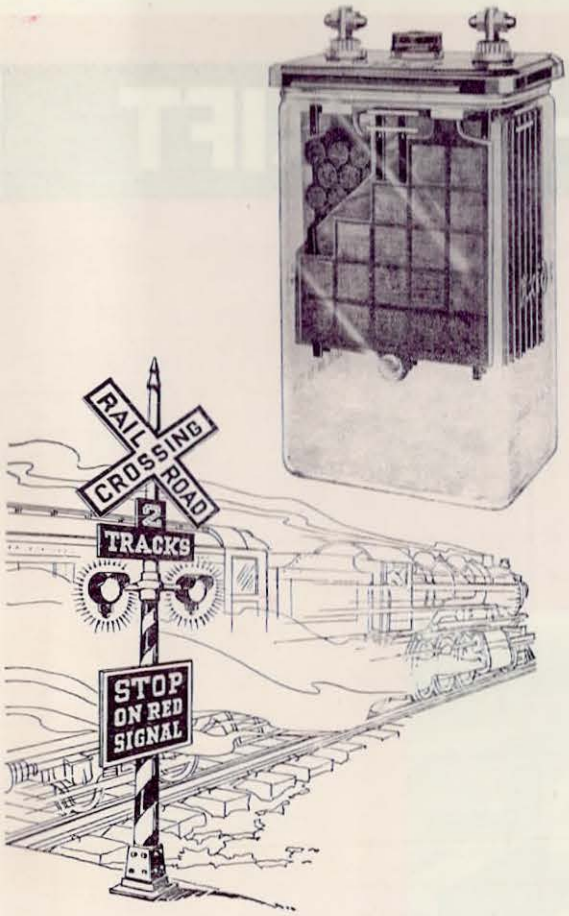


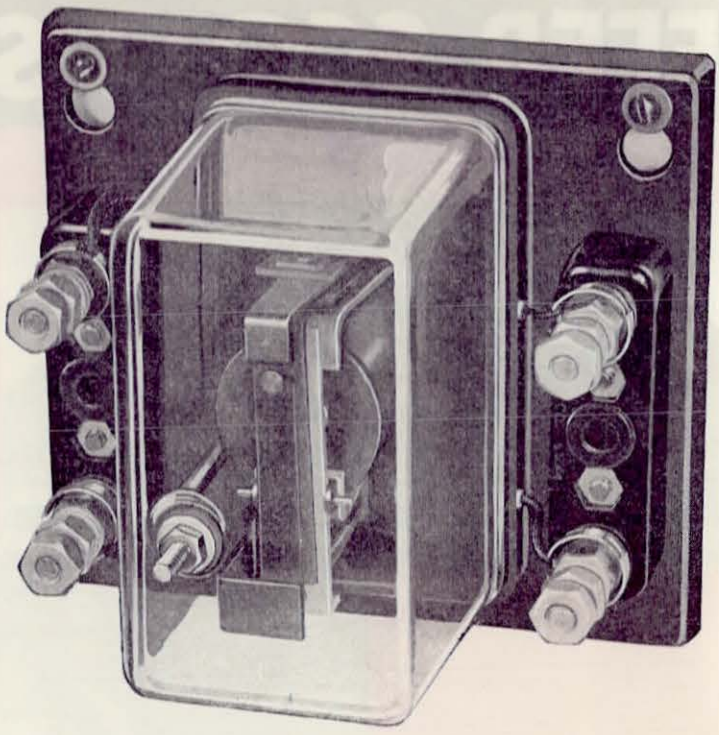
Eight G-R-S Retarder equipped yards show an average annual saving of 44.24 percent on capital investment.

SIGNAL COMPANY

NEW YORK St. Louis A1241

Madrid Melbourne Calcutta Buenos Aires





WHERE LOADS AND TEMPERATURES VARY

New Exide Two-Rate Charge Control Unit automatically controls battery charging . . .

With the present demand for increased economies in maintenance, the New Exide Two-Rate Charge Control Unit not only reduces maintenance cost but insures keeping the battery more fully charged, at the same time avoiding unnecessary and uneconomical over-charging.

At highway crossings, for instance, traffic may change considerably from day to day and this load variation coupled with changes of temperature may combine to produce extremes in the charging requirements of the battery. Under this and similar conditions the Exide Two-Rate Charge Control Unit with the Exide A. C. Floating Battery System, offers a tried and proved means of improving maintenance.

Note the following points:

1. The relay is automatically reset each time the signal operates, thus putting the battery on charge at the high rate until the voltage rises to a predetermined value when it reduces the charge rate to normal.

2. The relay provides inverse temperature compensation throughout a wide range, thus accommodating itself to the charge characteristics of the battery. The exciting coil is connected direct to the battery terminals without ballast resistance of any kind.

3. Following a power outage, the high rate is continuous until the battery is 85% to 90% fully charged, and successive high rate charges of shorter duration bring the battery to full charge.

4. The amount of charge received by the battery is automatically proportioned to the amount it discharges.

5. In many cases the power off relay can be eliminated, the battery carrying the load at all times. This means added power economy, as the exciting coil requires less than 1 watt.

The Exide Two-Rate Charge Control Unit is designed particularly to fit the characteristics of Exide Batteries. These batteries have been serving more than a hundred different railroads both reliably and economically for many years. Write for booklet giving full information on the application of Exide Two-Rate Charge Control Units.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

NRA CODE

Exide

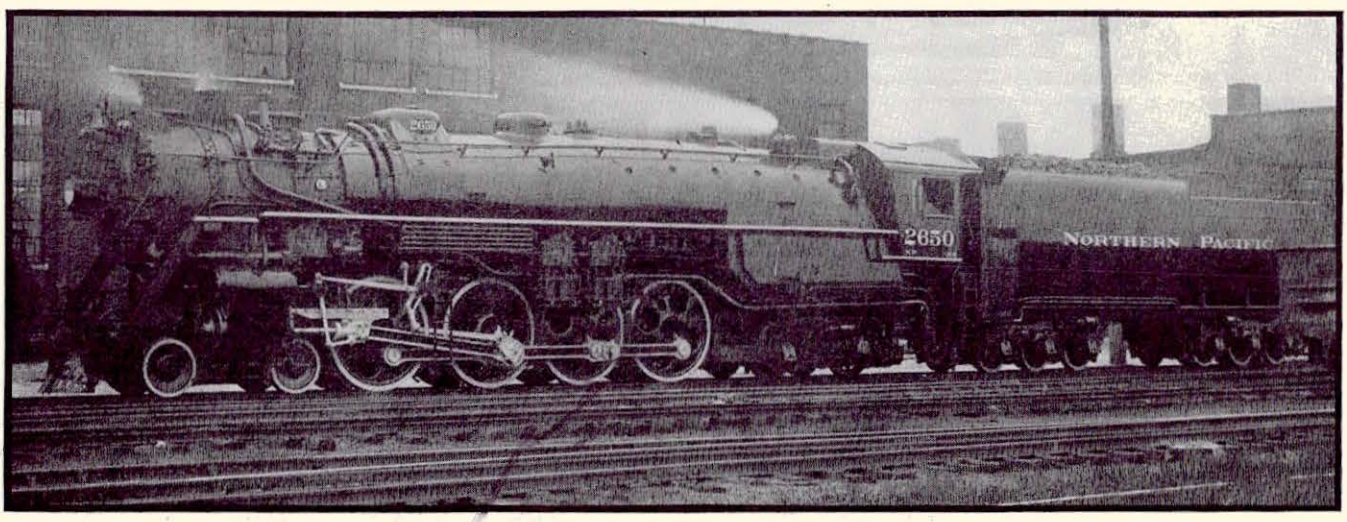
TWO-RATE CHARGE CONTROL UNIT

GIANT NEW NORTHERN PACIFIC LOCOMOTIVE

ON EXHIBITION AT PRESENT IN THE

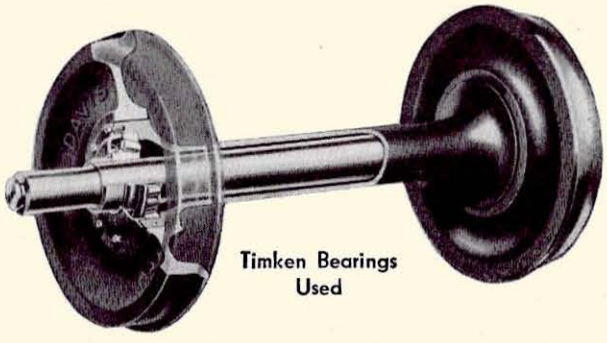
WINGS OF A CENTURY

AT A CENTURY OF PROGRESS



American Steel Foundries Roller Bearing Units are used on all tender positions and on the front trailers.

This locomotive is one of ten being built for the Northern Pacific Railroad. Each locomotive has a weight of 857,900 pounds and the tender has a capacity for 27 tons of coal and 20,000 gallons of water.



Timken Bearings Used

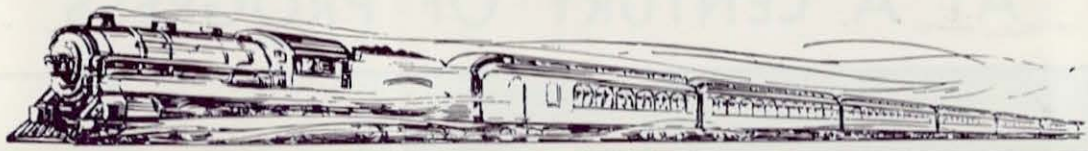
The famous North Coast Limited train, with its Roller Bearing Unit equipped Pullman cars and Diners, will be handled by these fully equipped roller bearing locomotives on a continuous run of 906 miles between Jamestown, North Dakota and Missoula, Montana.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

The

ORANGE BLOSSOM SPECIAL . . .



On this famous train to Florida "FREON" provides cooling comfort and safety

TRAVELERS on the Orange Blossom Special—famous train of the Seaboard Air Line Railway—reach their destination in Florida fresh and rested.

Every car on this train is air-conditioned. There's an even flow of pure air at all times. The temperature inside is healthful, comfortable and uniform. Passengers are never annoyed by dust and cinders, noise and smoke, or by dry heat.

"Freon" is the refrigerant used. It is safe, non-toxic, non-flammable and assures maximum comfort for the passengers.

"Freon" is, in fact, the preferred refrigerant for more than 99% of all mechanically air-conditioned railway cars.

KINETIC

FREON

REG. U. S. PAT. OFF.

a safe refrigerant

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE

Experimentation *as applied to* Wood Preservation

Why
AMCRECO PRODUCTS
have maximum quality

1. Carefully selected timber.
2. Incipient decay avoided.
3. Framing before treatment.
4. Preservative of known value.
5. Adequate treatment.
6. Treatment accurately timed to proper seasoning.
7. Unequalled facilities and personnel of the leading producer.

Wood Preservation as an art has been largely developed by experimentation and trial. This work has gone on practically continuously for the last hundred years. During this period, numerous theories, methods and preservatives have been tried but only two have survived the true test of time in service. The experimentation continues with some preservatives being offered for use on the results of accelerated tests and relatively short periods of service. While such experimentation is desirable, certain results cannot be expected from other than standard preservatives, proven through long periods of service.

NRA MEMBER U.S. WE DO OUR PART

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

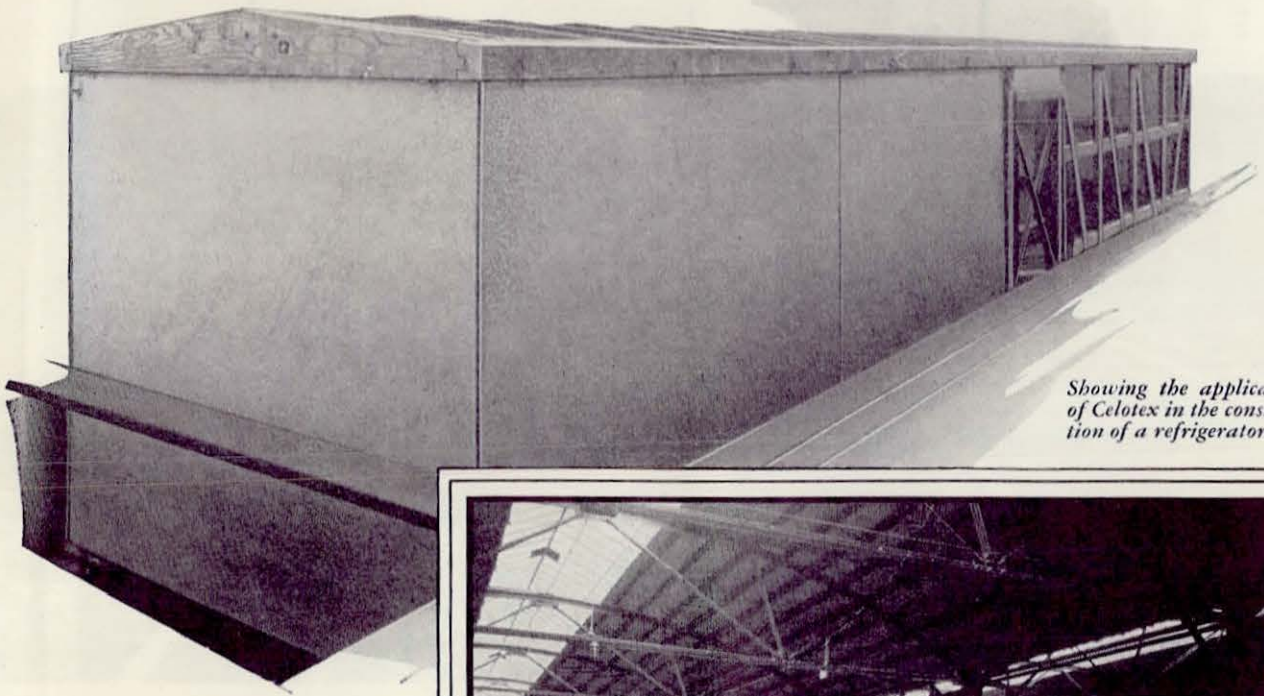
GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE — KENTUCKY

All Railroads *need* CELOTEX

For building · For interior finish · For insulation

For protection of foodstuffs in refrigerator cars



Showing the application of Celotex in the construction of a refrigerator car.

Celotex lines the ceiling of the C & N W Yard Office, Proviso, Illinois

The reason so many railway maintenance divisions make a practice of keeping a stock of Celotex Insulating Cane Board on hand is because this general purpose building material has so many necessary uses and special advantages. There is scarcely any building of any kind, new or old, where it cannot be employed effectively for a variety of purposes and, usually, with considerable economy.

Celotex both builds and insulates. The boards come in various sizes and thicknesses, are easy to handle, cut, saw and machine. They are light in weight and yet inherently so sturdy that greater structural strength is achieved. They require no special skill to apply.

Made of long, tough cane fibres, Celotex retards the passage of heat and cold because it possesses high insulating value. This superior insulating quality makes Celotex the favored material of the principal builders of refrigerator cars. Safe storing and economical handling of perishable foods are calculable problems instead of chance risks.

Celotex is a superior sheathing or a plaster base. It is also widely used as an Interior Finish for offices, stations, work rooms and railway quarters of all types. The Celotex boards are applied directly to new or old walls and ceilings. No special decorations are required as the boards are finished in an attractive and neutral buff tone; but they may be painted or stenciled; or beveled or grooved to pattern, if desired.

Quiet, Please!

Better work can be done in quiet offices. Acousti-Celotex, available in rectangular tile units and applied directly to existing walls and ceilings, absorb noise. The high acoustic absorptivity of Acousti-Celotex is in no way diminished by painting, but continues as long as the building endures.

Ask For Celotex and Be Sure It's Celotex You Get

No other insulating building material offers all the Celotex features. Of exceeding importance is the fact that Celotex is protected against attack by Termites. All Celotex Cane Fibre Products are manufactured under the Ferox Process (patented) and therefore effectively resist damage by Fungus Growth, Dry Rot and Termites (White Ants).

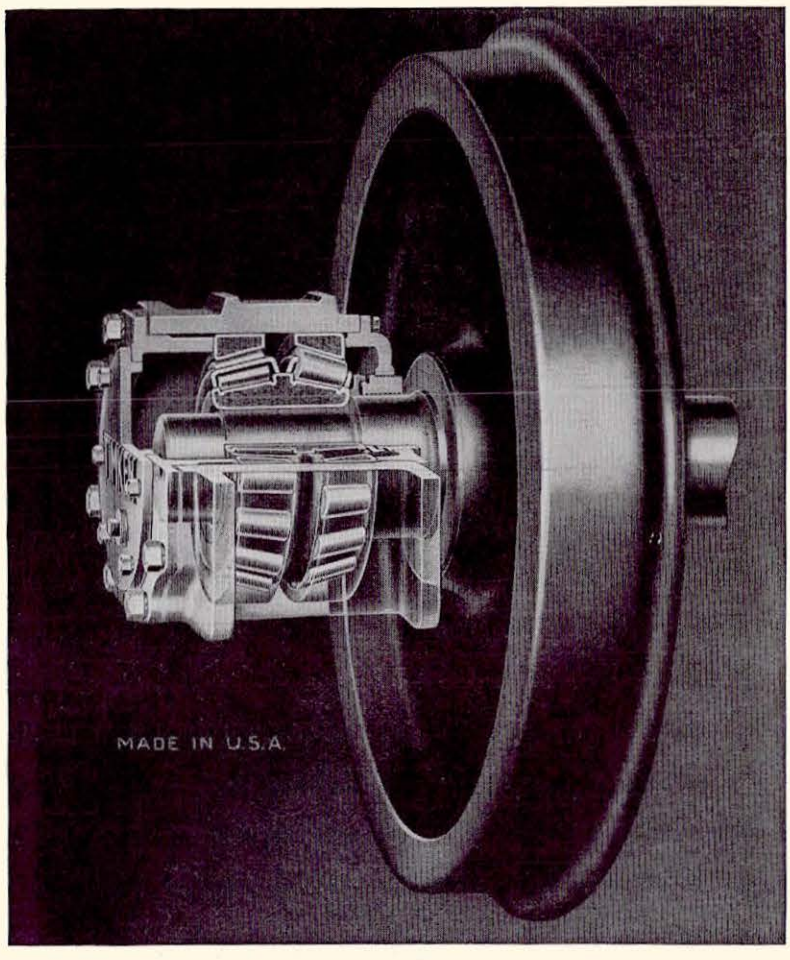
THE CELOTEX COMPANY, 919 NO. MICHIGAN AVE., CHICAGO, ILL.

CELOTEX
BRAND
INSULATING CANE BOARD
(Reg. U. S. Pat. Off.)

BUILDS · INSULATES · DECORATES

TIMKEN

A Predominant Factor in 1934 Railroad Developments



ORDERS for Timken Railroad Bearings received so far this year exceed in volume and importance those of any similar period for several years past—and all of them are repeat orders. One hundred and sixty-two railroads now operate Timken-equipped locomotives and rolling stock.

Just another proof of Timken leadership on American railroads.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

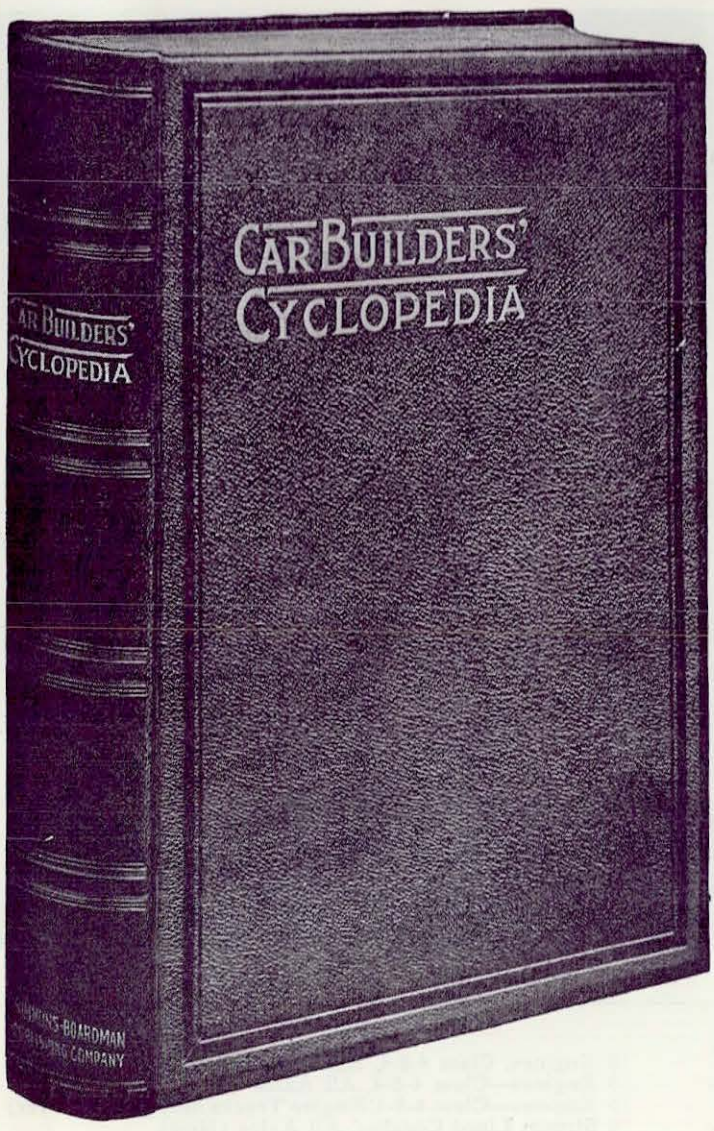
The Following are Some of the Outstanding Orders for Timken Railroad Bearings Received So Far this Year

Northern Pacific	10	Engines, Class 4-8-4, All Axles (New)
Lackawanna	13	Engines—Class 4-8-4, All Axles (New)
Lackawanna	10	Engines—Class 4-8-4, Engine Trucks only (Changeover)
Milwaukee	70	Stream Lined Coaches, All Axles (New)
Milwaukee	25	Baggage Cars, All Axles (New)
Pennsylvania	1	Electric Locomotive—Class 4-6-6-4, All Axles (New)
Pennsylvania	1	Electric Locomotive—Class 4-8-4, All Axles (New)
Pennsylvania	28	Electric Locomotives—Class 4-6-4, All Axles (New)
Lehigh Valley	2	Engines and Tenders—Class 4-8-4, All Axles (New)
Lehigh Valley	3	Engines—Class 4-8-4, Engine Trucks only (New)
Burlington	1	Engine—Class 2-10-4, All Axles (Changeover) except Trailer Truck
Burlington	1	High Speed Train, The Zephyr, All Axles (New)
Boston and Maine	5	Engines—Class 4-8-4, Engine Trucks only (New)
Boston and Maine	5	Engines—Class 4-6-4, Engine Trucks only (New)
Boston and Maine	2	Rail Motor Cars, All Axles (New)
New Haven	1	High Speed Train, The Rail Zeppelin, All Axles (New)
New York Central	29	Tenders, All Axles (Changeover)
South Manchurian Railway	11	Tenders, All Axles (Changeover)
New York Rapid Transit	1	Subway Train—5 Cars, All Axles (New)
Uraguayan St. Railway	4	Rail Trains, All Axles (New)

TIMKEN BEARING EQUIPPED

TIMKEN *Tapered Roller* **BEARINGS**

While They Last—Only $2.50



To clear the small remainder stock of the Thirteenth Edition (1931) of the "Car Builders' Cyclopedia" the price is being reduced from $5.00 to $2.50. Here is an opportunity to obtain one of these valuable books at cost, postpaid.

This volume is 9 x 12 inches in size, contains 1,260 pages illustrated with 3,400 photographs and scale drawings of all kinds of cars and their equipment. It is solidly bound in heavy buckram.

The information contained in this book is authoritative. It was compiled with the aid of an advisory committee from the Mechanical Division of the American Railway Association. The practical car department man will find in it an invaluable compilation of the best knowledge on the subject.

Contents of Sections:

DICTIONARY OF TERMS

Freight Train Cars: United States and Canada
Freight Car Construction Details
Railway Service Cars: Non-Revenue Equipment
Passenger Equipment Cars: United States and Canada
Rail Motor Cars: Internal-Combustion; Steam, Electric
Passenger Car Construction and Equipment
Passenger Train Lighting
Passenger Train Heating, and Ventilating: Air Conditioning
Car Trucks: Roller Bearings; Lubrication
Couplers and Draft Gears: Buffers; Attachments
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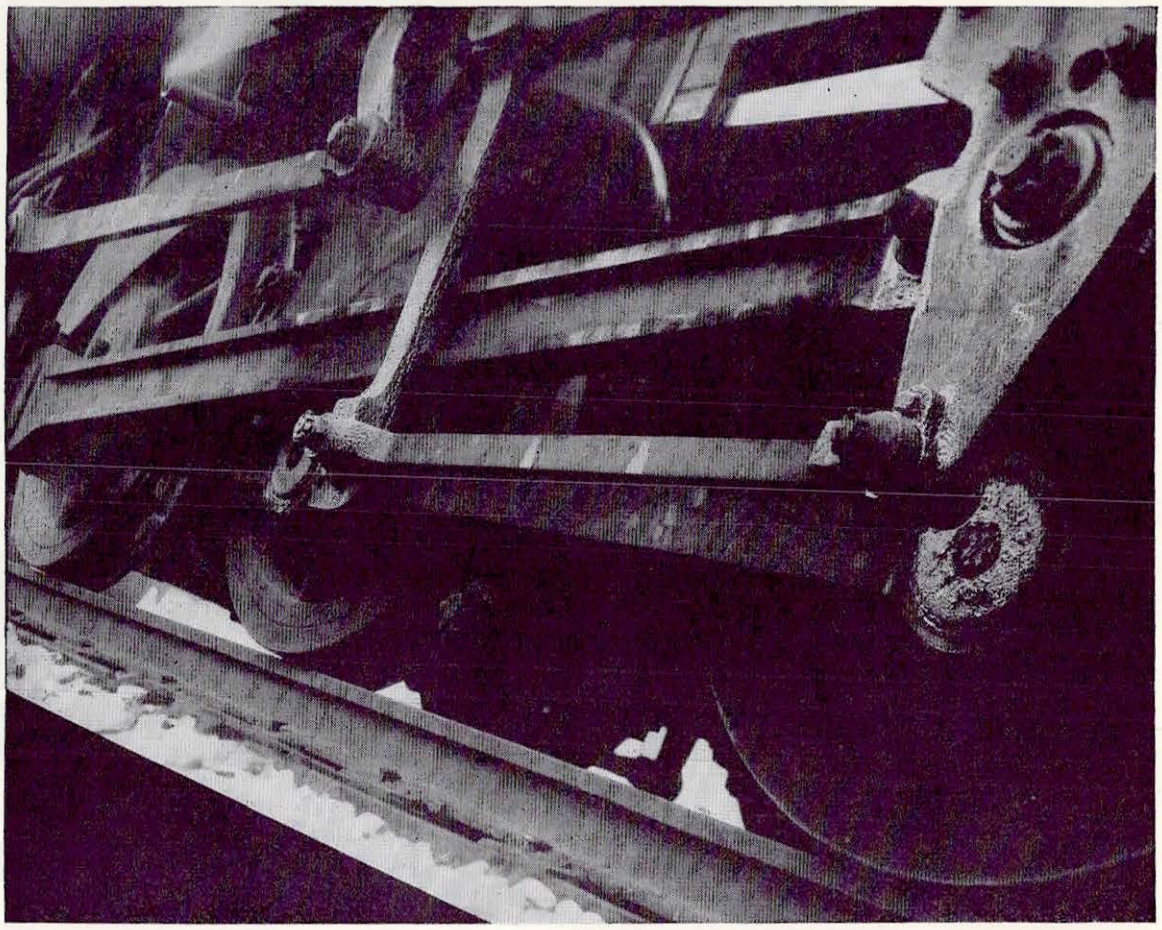

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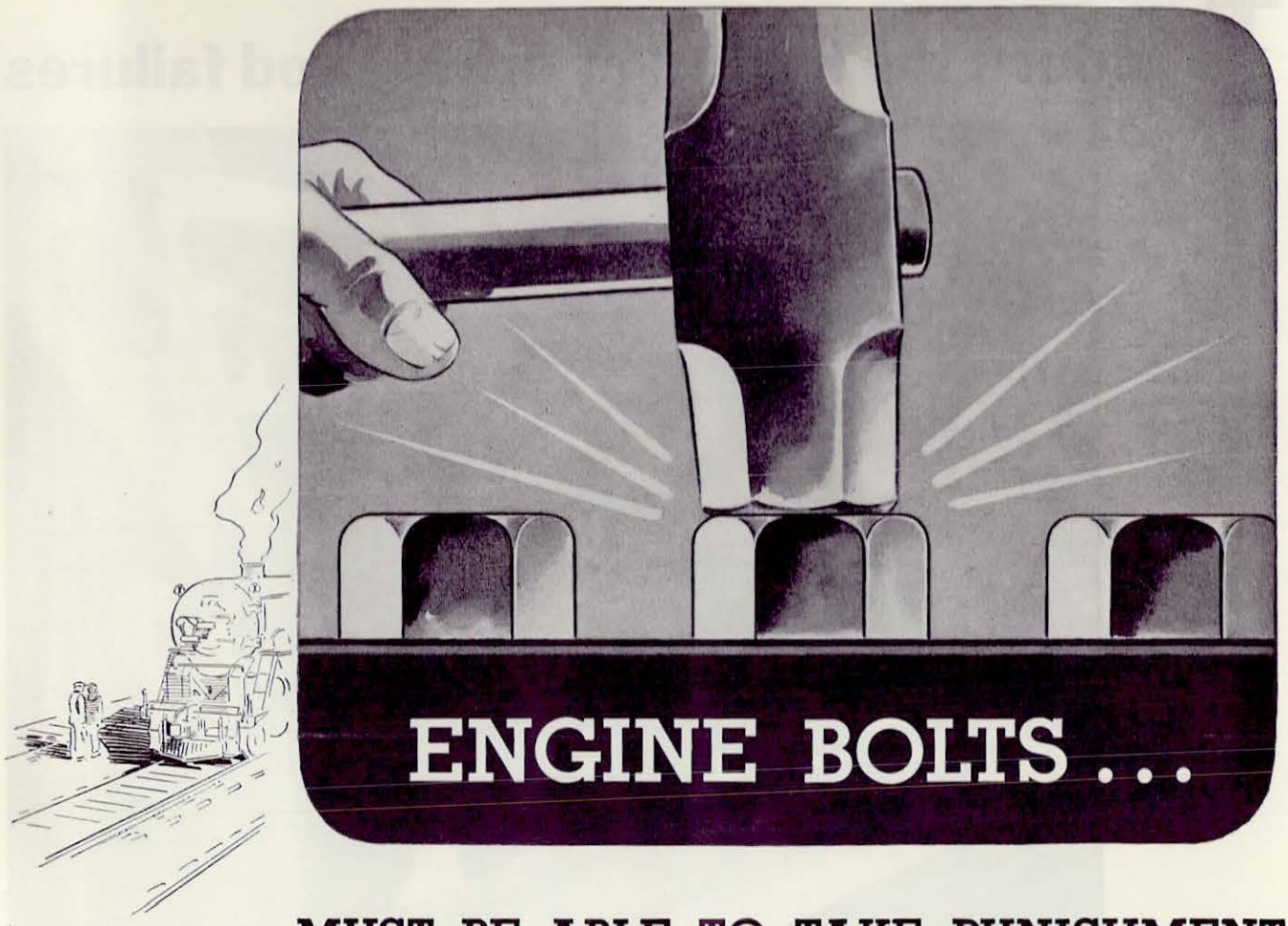

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RAILWAY AGE

Business and the New Deal

Probably the best thing for the people of this country that occurred within the last fifteen months was that general business became worse in July, August and September, 1934, than in 1933. Certain important New Deal policies are so unsound that the longer they were kept in effect the more harm they were bound to do. For almost a year before and during most of a year after they were adopted the general trend of business was actually or apparently upward. The New Dealers claimed for them credit for the entire improvement. Thus improvement was made a defense and argument for policies which were certain sooner or later to arrest it and the longer it continued in spite of them the more difficult it would be to get rid of them.

The real or apparent improvement ended in March. Railway car loadings had then become only 36 per cent smaller than their 1925-1929 average and were 31 per cent larger than in 1933. Throughout the following six months the trend was downward. In April, May and June car loadings were 39½ per cent smaller than in 1925-29 and only 12 per cent larger than in 1933. In July, August and September they were about 43 per cent less than in 1925-29 and about 3 per cent less than in 1933. The decline of private business in the summer of 1934 was greater than these figures indicate because government expenditures for public works, relief, etc., were larger than in 1933. Thus there had come an only too easily demonstrable recession instead of an improvement to account for. Explanation by the proponents instead of the opponents of the New Deal became necessary. The rising adverse business sentiment has been made vocal by the Chamber of Commerce of the United States, the bankers composing the Advisory Council of the Federal Reserve Board, the National Association of Manufacturers and other organizations and agencies.

Richberg as Moses of Recovery

The most important question was as to how the views of President Roosevelt would be affected. He has given two answers. One is the appointment of an Industrial Emergency Committee composed of radicals with Donald R. Richberg as chairman. The other is the radio address on the evening of September 30. The two answers seem almost to cancel each other.

As chairman of the new committee to develop and co-ordinate all the recovery policies of the administration, especially those of NRA, Mr. Richberg apparently has become an influence of more importance to industry and commerce than was General Johnson. What can business expect from him? He is widely known, personally and by reputation, in the railway and the railway equipment and supply manufacturing fields. He was for several years general counsel of the National Conference on Valuation of Railroads, the purpose of which was to make the government's valuation of railroads and railway profits as small as possible, and represented this organization before the courts in the litigation of the Interstate Commerce Commission's decision in the O'Fallon case. He was chairman of the resolutions committee of the Progressive national convention which nominated the first Senator Robert M. LaFollette in 1924 for president on a platform advocating such policies as government ownership of railroads. He was long general counsel of the Railway Labor Executives Association.

Mr. Richberg, in his political utterances and in the many instances in which he was spokesman for the railway labor unions in controversies with the railways, was habitually reckless in his attacks upon private enterprise and the profit system especially as exemplified by the railroads. In short, he has been a radical exponent and advocate of the socialist-labor economic principles upon which the New Deal has been principally founded. As chairman of a committee to develop and co-ordinate government recovery policies he must be regarded as a singular and sinister portent by those favorable to private investment and enterprise.

President Roosevelt to Business

In his radio address on Sunday night the President for the first time since the New Deal began used language indicating a realization that the uncoerced assistance of business men is needed to revive business. "We count, in the future as in the past," he said, "on the driving power of individual initiative and the incentive of fair private profit, strengthened with the acceptance of those obligations to the public interest which rest upon us all. We have the right to expect that this driving power will be given patriotically and wholeheartedly to our nation."

Profits are the fuel used in driving the engine of business. Government policies which limit or reduce the fuel when the engine is almost stalled from lack of it, and envelop the driver in a fog of uncertainty, are not adapted to increasing either the effective power of the machine or the confidence and initiative of the driver. Business has a right to ask only a "fair private profit." But, in view of all that has been said and done against the profit system within the last year and a half, what do the words "fair private profit" mean to the school of economic thought dominant in the ad-

ministration? Mr. Richberg's record and recent appointment do not alleviate business men's doubts and fears regarding this matter.

"Nearly all Americans are sensible and calm people," the President declared. "We do not get greatly excited nor is our peace of mind disturbed, whether we be business men or workers or farmers, by awesome pronouncements concerning the unconstitutionality of some of our measures of recovery and relief and reform. We are not frightened by reactionary lawyers or political editors." If nearly all Americans are sensible and calm they have acted remarkably contrary to their nature during the last decade. If the President thinks all the "awesome pronouncements" regarding some of the administration's recovery, relief and reform policies have related to their constitutionality or have emanated from reactionary lawyers and political editors he is singularly uninformed. They have caused the greatest alarm among and drawn the most destructive attacks from business men, economists and editors who are much less concerned regarding their legal or political phases than because of their manifest tendency to hinder the increase of production and commerce which alone can cause the full re-employment of labor and the increase of national income with which to pay it.

On Restoring Business Confidence

Mr. Richberg appears to be almost as unfitted by his record, ability and experience, temperament and economic principles to inspire confidence of business men in him as a Moses to lead in the development and coordination of recovery policies as anybody that could have been found. But as a whole recent developments have been encouraging rather than otherwise. Business has quit taking unsound government policies lying down, probably because it has finally become more afraid to run than to fight. The President in his public utterances long dismissed criticisms of the New Deal in a spirit and tone of contemptuous jocularity because he knew such criticism represented little effective public sentiment. The tone and substance of his last address indicate a realization of the overwhelming change in business sentiment that has occurred, especially since business became actually worse than last year.

The President must know that recovery cannot occur in the teeth of present business sentiment—that as long as it exists the "driving power of individual initiative" will be lacking—and that therefore present business sentiment must be changed. He must know, or at least he apparently is beginning to learn, that "this driving power will be given patriotically and wholeheartedly" only by men confident that increased employment will increase, not reduce, net earnings; confident that new capital invested will have opportunity to earn, not what a few radical brain trusters, but what its owners, regard as a fair profit; and confident that every increase in efficiency and economy in business management effected will not be penalized by taxation or labor policies designed to make initiative and driving power of benefit only to those who do not furnish them.

Such confidence has not recently existed, and the President's address is encouraging because it indicates that he is beginning to realize it is quite as necessary to the success of a recovery program for it to have the support of business sentiment as the support of coercive and threatening laws or of radical labor leaders and brain trusters. But it will require more than eloquent and reassuring language to break the present deadlock between the New Deal and business. Unlike a large majority of voters, most business men are influenced less by what they feel than by what they think, less by eloquence than by action, and the administration will have to adopt policies actually helpful to business to restore the confidence it has destroyed by policies harmful to it.

Some Favorable Developments

Fortunately, it has been affording some evidence of a disposition to do this. The National Housing Act is a measure to stimulate private expenditure of money partly borrowed from the government, and it is promoting expenditure faster than was predicted only a few weeks ago. The President in his address admitted that "there may be a serious question"—a question raised long ago by critics of the New Deal—"as to the wisdom of many of those (NRA) devices to control production, or to prevent destructive price cutting which many business organizations have insisted were necessary, or whether their effect may have been to prevent that volume of production which would make possible lower prices and increased employment." After all that has occurred within the last year it is gratifying to have some recognition from such a high source of the obvious fact which this paper has so often emphasized that increase in the volume of production is needed more than redistribution of a greatly reduced national income.

The administration is manifesting a strong desire to do something to improve the railway situation. The President announced a plan in his radio address of getting industrial and labor leaders together to establish a "truce" that will stop costly strikes during the present emergency. These strikes have been due to government policies encouraging labor leaders and workers to believe that private capital and all other classes were to be sacrificed to give wage earners less work and more pay, and that wage earners were entitled to use almost any means to get these blessings. Business cannot and will not establish a truce to make any agreements involving further general reductions of hours, advances of wages and strengthening of labor unionism. Realizing, as he apparently does, the great change in business sentiment that has occurred, the President can hardly expect that the truce he proposes will be based upon agreements involving any of these things.

Bad Business is Bad Politics

The recent decline of business has been a good thing because it has so consolidated and aroused business sentiment as to present squarely to the administration the question whether it will go forward with its New

Deal policies in the teeth of an almost 100 per cent adverse business sentiment or will modify and supplement them in accordance with business sentiment. If it goes forward in disregard or defiance of present business sentiment, which is supported by almost all economists of standing and ability in the country, the resulting conflict between government and business will be extremely harmful to all classes, including wage earners. If the administration finally decides, on the other hand, that economic recovery is as important as "reform," and heeds demands of sound economic opinion for the liberalizing of some of its present policies and the adoption of others more constructive, the improvement in business which began two years ago will be resumed on a larger scale. We believe the latter will occur. In the long run bad business is always bad politics. The New Deal party is obliged for political reasons to stand by its policies as long as a Congressional election is approaching. Its leaders must know, however, that a continuance of bad business during the next two years would almost certainly be disastrous to it at the national election in 1936. Therefore, we confidently anticipate that during the next two years there will be much less emphasis in Washington upon reform and much more emphasis upon recovery.

The Future of The Steam Locomotive

The steam locomotive for light, high-speed passenger trains proposed by W. E. Woodard, vice-president of Lima Locomotive Works, Inc., in an article in the *Railway Age* of September 29, is of particular interest because of the adherence to a combination of straightforward elements of design, although in the selection of materials and in some of the details the locomotive differs materially from conventional current practice. Adherence to the staybolt type of firebox and the adoption of a moderate boiler pressure are among the outstanding conservative features in the proportioning of the locomotive. The proposal to use poppet type valves in order that shorter cut-offs may be employed than are feasible with reciprocating valves and the specification of rolled steel for frames are instances of departure in details from the well beaten paths.

The decision not to depart from thoroughly established principles of fundamental design in adapting the steam locomotive to the requirements of the much talked about new type of passenger service is far from a reactionary step. In Germany during the past ten years the railways have had experience with a greater variety of experimental locomotives than have the railways in any other country in the world. The appraisal of these experiments seems to have led to a swing in thought in the direction of intensive development of locomotives involving well-established elements of design and away from a continuation in the development of the experimental types necessary for the utilization of the high pressures and temperatures on which major improvements in thermal efficiency depend. This change in thought is attributed by Prof. H. Nordmann in a recent article in the Zeitschrift des Vereines Deutscher Ingenieure to the tendency of increased first cost and increased cost of maintenance to offset the improvements in fuel economy, reluctance to run the risk of unreliability in service, and relatively low availability.

The later item, caused by what A. I. Lipetz calls "complication of design" in his recent paper before the Canadian Railway Club, is one which weighs heavily against the successful introduction of radically changed motive-power units. "Complication of design" does not necessarily mean a design involving more parts or parts of greater intricacy than those of locomotives of conventional types. The complication really arises from the fact that the parts are different and, where only one or two units of a kind are in service, not readily available when needed in the shop or enginehouse. For this reason radical innovations in the elements of the locomotive led to unpopularity, and in America, just as in Germany, unpopularity is a strong factor against successful commercial development.

The fact that internal-combustion power plants are installed in the light-weight, high-speed articulated trains of the Union Pacific and the Chicago, Burlington & Quincy has led to a popular impression that steam is to be generally supplanted. This is a repetition of the impression created thirty years ago by the predictions of the coming supremacy of electrification. No type of motive power that has been or conceivably may be developed will not find a place of usefulness on the rails. Steam, however, has and no doubt will continue to retain a field for itself, if for no other reason than the relatively low first cost of steam locomotives. The importance of low first cost becomes sharply evident when locomotives are forced to stand idle for lack of traffic. This substantial numbers of them must do during parts of the year even when general business and traffic movement are at their best.

For short train units, particularly where service conditions are sufficiently stable not to require great flexibility, there is a field for the self-propelled train equipped with the Diesel-electric power plant. For conditions where longer trains and flexibility in train consist are required the separate locomotive is best adapted. Here the steam locomotive is still supreme, although it will be subjected to competition in the lighter ranges of service and under conditions where a high utilization factor can be maintained.

The position of the Diesel-electric locomotive in switching service, particularly where intensive utilization is possible, is well established. In road service, however, its position for some time to come will be experimental and its economic handicap far greater. And the stimulus which the thought of such competition is already giving the steam locomotive designer will not leave the steam locomotive to rest long on its present laurels.

Railroads Ask Rate Increase

Without it, it is estimated there will be a deficit of $73,000,000 for the current year

WASHINGTON, D. C.

STATING that the railroads "are simply asking to be classified with industry generally and to be permitted to advance the price of what they have to sell when costs which they cannot control make such a course imperative," representatives of the railroads on October 1 began their testimony in support of their application to the Interstate Commerce Commission for authority to increase rates on a large part of their freight traffic. This characterization of the railroad case was made in an opening statement by R. V. Fletcher, general counsel of the Association of Railway Executives, who pointed out that the proposition to increase these rates comes at a period of steadily rising commodity prices and said "it is put forward in all seriousness and not for some fancied and fantastic reasons of policy." The railroads, he continued "are not trifling with their patrons from any foolish conception of what strategy demands."

Commissioner Aitchison Presides

Commissioner Clyde B. Aitchison presided over the hearing and a co-operating committee of state commissioners sat with him. He explained that other members of the commission, some of whom were sitting in other cases, two in an air-mail rate case across the hall, would try to be present from time to time and that a daily report would be prepared for their benefit but he asked that argument be omitted from the testimony and reserved for the argument before the full commission, which will decide the case. Commissioner Aitchison also said that it had been impossible to reach a definite conclusion as to whether it would be necessary to hold hearings away from Washington, for which there have been many requests, but that an announcement would be made after more opportunity had been allowed to learn what would develop at the initial hearing. He also urged that every effort be made to consolidate the testimony and cross-examination of representatives of common interests and to condense the testimony to the essential facts and he followed this up by asking some of the witnesses to file parts of long prepared statements without reading.

Large Opening-Day Attendance

There was an attendance of over three hundred on the first day of the hearing, greatly overtaxing the capacity of one of the two large hearing rooms in the commission's new building.

At the outset John E. Benton, general solicitor of the National Association of Railway and Utilities Comissioners, filed a motion on behalf of 18 state commissions in the West that the proceeding be dismissed in so far as it includes rates which are involved in the western grain rate case, the western trunk line class rate case, and the consolidated southwestern cases, in which a large volume of testimony has recently been presented on rehearings and which are awaiting decision by the commission. Mr. Aitchison said that the motion would be taken under consideration. The same state commissions also asked the commission to hold further hearings at convenient points after the close of the Washington hearing.

Railroad Case Outlined by R. V. Fletcher

In his opening statement Judge Fletcher said that the roads would not at this time lay emphasis on their constitutional right to a fair return. The testimony would show that the railroads are receiving far less than a fair return but would not deal with questions of valuation or fair return. He also pointed out that the average revenue per ton-mile in 1933 was 21.65 per cent less than in 1921. He filed an amendment to the appendix filed with the original petition in the case, making some changes in the statement of the increases proposed in various rates.

"Due to circumstances over which they have no control, the operating expenses of the railroads have been increased by nearly $300,000,000 annually," said Mr. Fletcher. "Without an increase in the rate base, the railroad industry this year will probably fall short of earning fixed charges by $73,000,000, as compared with a similar deficit of less than $6,000,000 in 1933.

"It must not be concluded that this situation is due in any degree to operating inefficiency. Our testimony will conclusively demonstrate the contrary. We will show that in the decade ending with 1933 speed of freight trains between terminals has been increased 50 per cent; the average tractive power of locomotives has been increased 26 per cent; the average cost of handling freight traffic per 1,000 ton-miles has been reduced 40 per cent; the average efficiency of coal used as fuel has been increased 25 per cent.

"The increase in operating expenses is due to a combination of increased wages and rising prices of the materials and supplies used in railway operation. The wage increase was the outcome of a controversy in the solution of which the President of the United States and the Federal Co-ordinator of Transportation participated. It assumed, therefore, the aspect of a governmental activity.

"The increase in material costs followed the operation of the national industrial recovery act and the adoption of the codes organized thereunder. Our testimony will show that when we compare 1934 with 1933, the cost of fuel coal has increased 29.5 per cent; fuel oil shows an increase in the same period of 32.8 per cent; cross ties, 23.6 per cent; timber and lumber, 54.2 per cent; iron and steel products, 6.3 per cent; and miscellaneous items, 14.1 per cent; making a weighted average increase on all commodities purchased of 20.4 per cent.

"This case is based upon the crying need of the railroads for increased revenues. While the gross revenues for 1933 fell 50.7 per cent below the revenues of 1929, operating expenses have kept pace with a decrease of 50.1 per cent. It is impossible, however, to maintain this ratio in the face of rising labor and material costs. In determining upon a plan for a moderate increase in

revenue the railroads were not unmindful of the conditions that prevail in industry, nor unaware of the threat of competitive agencies. They have also borne in mind what has been said by the commission in criticism of proposed percentage advances. They have, therefore, carefully examined the entire commodity list and proposed such advances as will produce rates that are no more than fair and reasonable and that will not result in substantial loss of traffic.

"Some question may be raised as to why the roads are asking for no more than $170,000,000 when their figures show an increase of almost $300,000,000 in expenses. The candid and sufficient answer is that the traffic officers of the roads are not able to say with any assurance, after a careful survey of the whole field, that increases in greater amount than those proposed would be productive of increased revenue and at the same time be safely within the zone of reasonableness."

Parmelee Shows Need For Increased Revenues

The need for additional revenues to meet rapidly rising costs of operation was urged by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, who appeared as the first witness. Tracing the course of railroad traffic and earnings throughout the last five years the witness said that in the first seven months of 1934 deficits were incurred by companies operating more than two-thirds of the total railway mileage of the country.

"In 1929," Dr. Parmelee testified, "railway companies operating 4 per cent of our total railway mileage incurred deficits. The proportion operated by carriers incurring deficits increased to 16 per cent in 1930; increased again to 42 per cent in 1931; and rose still further to 68 per cent in 1932. There was then a decline to 58 per cent in 1933, but in the period from January 1 to August 1 this year, this percentage has risen again until now 67.4 per cent of the railway mileage of the country is being operated by companies which have incurred a deficit so far this year.

"Companies operating at a net loss in 1933 reported an aggregate deficit of almost $153,000,000. This represents the extent to which considerably more than half the railway mileage last year operated in the red. The corresponding aggregate deficit of companies operating at a loss in the first seven months of 1934 is approximately $99,000,000.

"As of August 1, 1934," continued Dr. Parmelee, "26 Class I railroads operating a total of 40,565 miles of line, were in the hands of receivers or trustees in bankruptcy. Twenty-two of these 26 companies, operating 37,910 miles of line, went into receivership or trusteeship during the years 1930, 1931, 1932 or 1933. Twelve companies with 20,149 miles of line were placed in the hands of receivers or trustees in the year 1933 alone.

"In addition to the serious situation reflected in the foregoing figures, study of recent results in the net income factors brings out the fact that whereas net income generally increased over the preceding year, from May, 1933, to April, 1934, the reverse is now true. Net income, which had shown substantial percentages of increase over the previous year in every month from May, 1933, with but a single exception, declined 23 per cent in May, 1934, and dropped 73 per cent in June, 1934, below the levels of the previous year, while net income of $30,000,000 in July, 1933, was replaced by a deficit of $7,000,000 in July, 1934. Judging from the most recent figures which show continuing declines in freight traffic during August and the first three weeks of September, 1934, the downward sweep of the curves of traffic, revenues and net earnings has not been checked. This may be more clearly visualized if I call attention to the fact that in every one of the first 26 weeks of the year, to June 30, an increase in carloadings was reported, averaging 15.4 per cent for the period; while in every one of the 12 weeks since July 1 a decrease in carloadings has been just as regularly reported, averaging 4.4 per cent for the period.

"In addition to the downward trend of railroad traffic and gross earnings from the present low levels, the carriers find themselves confronted with immediate and substantial increases in their operating expenses which will tend to even further reduce the level of net earnings. The complete restoration of the wage deduction, on the basis of the estimated 1934 payroll, will increase railway operating expenses by the annual total of $156,195,000.

"Furthermore, current railway operating expenses have not yet fully reflected the substantial increases which have occurred in the prices of the various materials and supplies used in railway operation. From May, 1933, to the present time the prices of materials and supplies used in railway operation have shown an increase of 20.4 per cent, which, on the basis of 1934 consumption, represents an increase of $134,367,000 in railway operating costs. A still further increase in expense arises from the operation of the railroad retirement act, which became effective on August 1 and the constitutionality of which is now being questioned in the courts.

"The actual net railway operating income earned in the first seven months of this year amounted to $261,000,000. Assuming, in spite of the present downward trend of traffic, that the net earnings of the last five months of this year will equal those of the same months of 1933—$254,000,000—this would yield a total net railway operating income for the year 1934 of $515,000,000. From this estimated total, however, there must be deducted, for the period August-December, sums of $17,000,000 representing increased wages; of $55,000,000 representing increased costs of material and supplies; and of $26,000,000 representing the cost to the railroads of the railroad retirement act. This would produce a net railway operating income for the year of $417,000,000 and would leave, after the payment of fixed charges a net deficit of $73,000,000 for 1934 as compared with a deficit of less than $6,000,000 in 1933. Furthermore, had these three items of present and prospective increased cost been in effect throughout the entire year 1934, it appears that the final results of operation for the year would have been a net deficit in excess of $280,000,000."

Gormley Describes Operating Efficiency

The railroads are transporting freight with the greatest efficiency on record despite the decline in traffic, M. J. Gormley, president of the American Railway Association, testified. He said that in 1933, the last year for which this information is available, the ratio of freight transportation expenses to total freight revenues was 30.1 per cent, the lowest for any year since 1920, in which year the ratio was 49.6 per cent, while in 1929 it was 31.3 per cent.

"During periods of declining traffic and revenues," Mr. Gormley said, "management is called upon to exercise its greatest efforts in the direction of efficiency and economy of operation, in order, first, that adequate service shall be maintained, and second, that the rate of reduction in expenses shall be closely approximated to the rate of decline in revenues. In maintaining the stability of the operating ratio during the past four years

of economic depression, the carriers reduced operating expenses by $575,000,000 in 1930 under the preceding year, by a further $708,000,000 in 1931, by another $820,000,000 in 1932, and still further by $154,000,000 in 1933. The reduction in 1933, compared with 1929, amounted to $2,257,000,000, or 50.1 per cent. This compares with a 50.7 per cent decline in revenues.

"It has been a real achievement on the part of railway management to keep freight transportation expenses within the limits dictated by the precipitous drop in revenues.

"The greater part of the increase in efficiency and economy in the operation of the railroads has been due to the very large capital expenditures which have been made since 1923 for improved locomotives, cars, signals, track and other things leading directly to operating efficiency. The opportunity for future economies and efficiency in operation depends in a very large degree, and more than upon anything else, on a continuation of the policy of replacing the less efficient types of cars, locomotives and other appliances. This necessitates a continuing and liberal expenditure of capital. The full fruits of efficiency are not realized unless they are accompanied by a continuing reduction in the number of units required to handle a given amount of traffic."

Mr. Gormley said that compared with the end of the year 1925, Class I railways, on August 1, 1934, owned 376,652 fewer freight cars and 14,906 fewer steam locomotives, adding, "Improved operating methods, resulting in more effective use of each freight car and locomotive power unit more than offsets the loss in total carrying capacity.

"Particular attention is called to the fact that there have been no decreases, in fact some increases, in the tons per car of carload traffic of the various commodities. For instance, with respect to products of mines, if there had been no increase in the actual tonnage loaded per car, 1933 compared with 1920, it would have required 575,000 more carloads to transport the 1933 tonnage of these commodities than were actually used. The improvement as to wheat is also striking. If there had been no increase in the average tonnage per car, 1933 compared with 1920, it would have required 37,000 more carloads to transport the tonnage than were actually used.

"The saving in maintenance and other operating costs due to the lesser number of freight cars and locomotives in service has been one of the outstanding economy meaures introduced in recent years by railroad management. These reductions are entirely due to the money spent for the replacement of old and inefficient equipment with more modern units, to increased speed of movement, and to more efficient handling of cars by shippers.

"There is every likelihood that with sufficient and proper credit to enable a continuation of the policy of replacing the less efficient units of equipment, it will be unnecessary for a long time to come, at least, to increase the ownership in numbers as it stands today. The last few years have shown a great many improvements in locomotives of various kinds, construction of cars, and decreased weight, without sacrificing capacity or necessary strength. It is not possible to predict today what the future will produce in the way of further improvements, but there appears to be considerable apportunity for improvement in this direction by the use of lighter weight materials in equipment construction, freight as well as passenger."

Proposed Rate Changes

D. T. Lawrence, chairman of the Traffic Executive Association (Eastern Territory), explained the proposed increases, saying that they had been carefully considered by a committee of 14 traffic executives, including representatives of eastern, southern and western territories, and that it was their combined judgment that they would produce an increase in revenues of $172,000,000 a year, assuming a traffic volume 10 per cent greater than that of 1933, after making allowances for some loss of traffic to competing forms of transportation. Explaining the treatment of short-haul rates he said that no increases were proposed for the higher class rates in the eastern scale for distances below 220 miles and that this would result in some departures from the percentage relations between classes prescribed by the commission in the eastern class rate case. He declined to assent to Mr. Aitchison's statement that this would amount to "dropping the eastern class rate decision into the waste-basket," but said that some departures from it were necessary because of the greater external competition for short-haul traffic.

Mr. Lawrence presented an exhibit showing the estimated increase in revenue on various commodities and groups of commodities. The greatest amount was shown for bituminous coal, on which the increase was estimated at $46,167,468, 20 cents a net ton. Anthracite coal showed an increase of $11,293,498, petroleum oils and gasoline, $6,780,822, lumber, shingles, and lath, $4,939,036, wheat, $4,102,152, and iron and steel, $4,042,487. The total for products of agriculture was $18,790,377; animals and products, $12,224,449; products of mines, $69,996,727; products of forests, $7,628,285; manufactures and miscellaneous, $47,919,694; and l.c.l. freight, $15,785,839.

Roy S. Kern, manager of the coal, coke, and ore bureau, Central Freight Association, testified regarding the application of the proposed increases to coal rates.

Proposed Increases Will Raise Freight Rate Level Not More Than Seven Per Cent

The increases proposed by the railways will mean an average increase in the present freight rate level not in excess of 7 per cent, A. F. Cleveland, vice-president of the Chicago & North Western, testified.

"The application of the railways," said Mr. Cleveland, "leads to the important consideration as to whether the proposed rates, if put into effect, will produce more or less revenue than the present rates, and it leads further to the collateral inquiry as to whether the rates are such as can readily be borne by the traffic. The answers to these two questions are largely a matter of informed judgment based upon experience. They cannot be conclusively determined except through experience based upon an actual operation of the rates themselves. The railways' proposal will not produce an increase above the present rates on the average in excess of 7 per cent. This means that the rate structure resulting from this application will be, as a whole, substantially below the level that resulted from the general 10 per cent reduction required by the Interstate Commerce Commission in 1922.

"Since the proposed rates are lower, on the average, than rates on which the carriers have heretofore operated, it would appear to be a fair deduction that they will not be higher than the traffic will reasonably bear. Take the case of wheat, for example, upon which a freight rate increase of three cents per hundred pounds is sought. This amounts to but 1.8 cents per bushel less than the frequent daily fluctuations in the price at the markets. It means little to the individual producer or to the ultimate consumer at point of delivery, but it means much to the granger railroads.

"In the second place, since we had an experience in

1931 and 1932 with temporarily higher freight rates which increased railway earnings in spite of the fact that shippers uniformly testified that in their judgment reduced earnings would result, it may reasonably be assumed that the railways' present proposal will likewise yield additional revenue.

"In the third place and, in my judgment, the most important proof that the traffic will bear the rates proposed and that these rates will produce more rather than less revenue, we have the informed judgment not only of the 14 railway traffic executives who worked up this proposal, but in addition thereto the judgment of practically every other railway traffic officer with whom this committee conferred during its long deliberations. These traffic officers are men of wide experience, thoroughly conversant with conditions on their respective lines; they are in daily touch with the situation and surely would not favor a change in rates if they believed that such a change would reduce rather than increase revenues. It is freely admitted that some traffic may be diverted to other channels under the various proposed increases, but it is the practically unanimous opinion that the proposed rate structure will produce revenues in excess of those now received.

"A rate structure to best serve the public as well as the railways themselves," Mr. Cleveland concluded, "must be elastic and must respond readily to new and changed conditions in industry. It cannot be frozen or too rigid if the interests of all directly concerned are to be best conserved, but it must follow a natural evolution in order to accommodate new conditions and requirements of commerce. It is therefore contemplated, should the rates requested become effective, that such changes as appear necessary and advisable will be made when investigation demonstrates that these changes will be mutually desirable. Our opposing friends need have no apprehension that the doors will be closed to a later consideration of any readjustment which experience indicates would be advisable. Competition will be met in the future as it has been in the past within the realm of reason."

C. E. Denney Testifies For Eastern Roads

Nothing is more essential to public recovery than the prompt improvement of the purchasing and employing capacity of the railroads, which only can be brought about by increasing their revenues, Charles E. Denney, president of the Erie, said in a statement read into the record because of his illness. "A survey of the situation," said Mr. Denney, "has satisfied me that even if an increase in traffic may be expected, it may not be expected in time or in sufficient volume to ward off the necessity for increased revenues which we are seeking. Railroad executives, as every other citizen interested in the welfare of the country, hope for a substantial increase in business and revival in trade and industry commensurate with the numerous governmental activities now being undertaken in co-operation with private capital, to bring about such a revival. The anticipated upturn in business and traffic has recently not continued and the gross revenue for 1934, judging from present and recent traffic, will not be materially greater than for 1933 and may not equal it.

"Prices of goods and commodities have generally been increased during the last year. Railroad rates since the elimination of the emergency surcharges on September 30, 1933, have not been increased. It is apparent that railroad rates cannot longer remain stationary while other prices increase. The increases requested in the application, while not sufficient to meet the needs of the railroads, will materially assist in relieving the situation until general business improves as we hope it will.

"An adequate and efficient railway transportation service is of vital importance, not only to the public in general, but to the shippers in particular, and Congress has written that factor into the present law to be considered by the commission in determining the value of the service to the shipper. The money derived from the proposed increase will soon find its way back to the channels of trade.

"In 1933, railroad operating expenses were only one-half of what they were in 1929 and yet the railroads of the country as a whole failed to take in enough money to cover their operating expenses, taxes and interest charges without any allowance for dividends to their stockholders. We can not by increased savings effect additional economies immediately or in the reasonably near future in addition to those heretofore effected which will materially offset the present increase in operating expenses which has already resulted and which will continue because of the increased cost of labor, materials and supplies. There is little question but that the railroads should spend more than is now being spent on maintenance."

Mr. Denney said that the only further economies on a large scale that can in his judgment be effected in the future, and which could not come in time to be of any help in the present emergency, will come either through justifiable consolidations or through substantial additional capital expenditures. "The comprehensive program of modernization and improvements adopted by the railroads in 1923 for the purpose of increasing the efficiency of their operations was continued by means of large capital expenditures each year to and including 1930 in spite of the then apparent depression and the marked recession in earnings as compared with 1929. Capital expenditures for the railroads have been substantial since 1930 but the trend by years has been downward. The capital expenditures for the railroads of the United States in 1933 amounted to approximately $104,000,000 and of this amount about $67,500,000 was spent by the railroads in the eastern district.

"Increasing capital expenditures in future years are necessary from the standpoint of industry. Improvement in the business of the so-called capital goods or heavy industries is dependent in a large measure on railroad purchases, not only for maintenance but also for additions and betterments."

Mr. Denney told the commission that the railroad executives believe that the increase in various freight rates sought in the petition will result in a substantial increase in net revenues. This conclusion, he said, was reached after detailed consideration was given to the possible effect of the proposed increased rates on the movement of traffic, including the possible diversion to competing forms of transportation. Mr. Dennev urged that regulatory legislation which will be fair to all forms of transportation be enacted at the next session of Congress and said that railroad officials are encouraged in that hope by the forceful position taken by the Interstate Commerce Commission and the Federal Co-ordinator of Transportation.

L. W. Baldwin Tells Needs of Western Lines

"Notwithstanding the unprecedented severity of this depression, the public today is getting the best railroad service it has ever had," L. W. Baldwin, trustee of the Missouri Pacific Lines, testified in appearing for the western carriers. "To continue that performance," Mr. Baldwin said, "and to be able to offer a better service as necessities require, there is an imperative need for more revenue. Based upon average mileage operated, carriers

operating 4.92 per cent of the mileage in the western district had a deficit in 1929, 18.96 per cent in 1930, 41.24 per cent in 1931, 61.30 per cent in 1932, and 65.82 per cent in 1933. Of the total of 135,474 average miles operated in 1933, 89,164 miles were operated at a loss. The deficit on roads having no net income increased, in round numbers, from $7,000,000 in 1929 to over $93,000,000 in 1933. Of the 46 Class I carriers in the western district, 34 had a deficit in 1932, and 32 in 1933. For the first seven months of 1934, only four of the major Class I carriers had sufficient income to cover their fixed charges. Furthermore, the western lines face an increase in operating expenses of at least $87,000,000 annually over the 1933 level for increases in wages and material and supply prices alone.

"By reason of the erosion of the rate level and the unprecedented general depression beginning with 1930, the western carriers are now confronted with the necessity of increasing their general revenues in order to meet the increasing costs of labor and material and supplies which are the reflection of the economic policies of the federal government; increasing their expenditures for maintenance of equipment and roadway and structures; meeting fixed charges; appropriating some of their net income, if they have any, for capital improvements; and continuing to render adequate and satisfactory service.

"Under present conditions," Mr. Baldwin continued, "the question arises as to what the western railroads will do for capital expenditures. The record of the past few years is far from encouraging. Already there is an immediate impending necessity for increasing expenditures substantially if the carriers are to function in the public interest. The average annual gross expenditures for additions and betterments to equipment from 1926 to 1930, inclusive, were $117,465,000. Compared to this, there was spent in 1931 the sum of $22,923,000; in 1932, $8,313,000; and in 1933, the small sum of $4,353,000.

"As to locomotives, $28,684,000 was spent in 1929, and $37,960,000 in 1930, while the expenditure in 1932 was $856,000 and in 1933, $728,000. As to freight cars, in 1929 the western railroads spent $78,436,000 and in 1930, $73,036,000 while in 1932 the expenditure was $5,223,000, dropping to $2,286,000 in 1933. In the case of passenger train cars, it appears that the long continuous decline in passenger earnings may have been arrested in the West and while there is no lack of passenger equipment, there is need of furnishing the most up-to-date types of cars both for economy and to compete with other forms of transportation. If the western lines are to hold the passenger business they now have and if they expect to still further increase that business, capital will be required to provide these modern cars, to modernize present ownership, and to air-condition many of them.

"I believe it is safe to say that no other industry has accomplished more during the past decade than the railroads in the direction of economy and efficiency in operation, and particularly do I believe this to be true since 1929. Among the things essential to the maintenance of a healthy condition of railroad transportation," Mr. Baldwin concluded, "it is safe to list:

"First: The strengthening of railroad credit to enable the railroads to provide adequately for further transportation needs and to care for their maturities as they become due.

"Second: For immediate needs, an increase in freight rates to meet partially the additional cost of increases in wages and materials and supplies, which, if not granted, will seriously impair the financial resources of the carriers and make it impossible to provide an adequate and efficient railway transportation service in the public interest.

"Third: An increase in the volume of profitable traffic is necessary to supply the deficiency in net railway operating income after taking care of higher wage levels and increased material and supply prices, which higher costs an increase in freight rates will not cover. The revival of business would have a wholesome effect on the railroads, and railroad revival would have a most excellent effect on business.

"Fourth: A recovery of lost passenger business by aggressively improving the character and comfort of passenger-train service.

"Fifth: Reasonable suitable regulation for all forms of competitive transportation, under the direction of the Interstate Commerce Commission."

Reductions in freight rates on livestock and feed made by the western railways in the drought-stricken areas resulted in a loss of revenue to those carriers amounting to $3,593,000 in the period from January 1 to August 1, 1934, according to testimony by L. E. Wettling, manager of the Statistical Bureau, Western Lines. When the similar loss in revenue through reduced rates on livestock and feeds made by 15 western railways in 1933 is added to this total, the contribution of the western lines to the relief of agriculture, the witness said, has been in excess of $4,100,000. "The normal charges upon this traffic in 1934," Mr. Wettling said, "would have been $105.72 per car. Under the rate reductions voluntarily made by the western railways, this business was actually carried for $63.09 per car, or for 59.67 per cent of the normal rates. In other words, there was a saving to the shippers of 40.33 per cent of the normal freight charges, this saving averaging $42.63 per car."

Discussing the financial position of the western railways, the witness pointed out that in the first seven months of 1934 the railways in the northwestern region incurred a deficit of $35,000,000; those in the central western region, a deficit of $11,000,000; and those in the southwestern region, a deficit of $21,000,000, making a total deficit for the western District as a whole of $67,000,000 for this period.

"At the end of 1933," continued Mr. Wettling, "western railways operating a total of 28,917 miles of line were in the hands of receivers or trustees. Of this total, 3,135 miles were in the northwestern, 9,184 miles in the central western, and 16,598 miles in the southwestern region. Furthermore, there has been a marked and increasing abandonment of railway mileage in the West. Lines abandoned and taken up totaled 264 miles in 1929, 336 miles in 1930, 255 miles in 1931, 357 miles in 1932 and 545 miles in 1933, while lines not taken up but upon which operation has been abandoned totaled 20 miles in 1929, 74 miles in 1930, 144 miles in 1931, 190 miles in 1932 and 557 miles in 1933. All told, a total of 2,733 miles of railway line in the western district has been abandoned in the five years 1929—1933. Since January 1, 1934, applications have been made to the Interstate Commerce Commission for permission to abandon an additional 1,645 miles of line in the West. Of this total, the commission has thus far authorized the abandonment of 929 miles, while no decision has yet been reached upon the abandonment of 587 miles."

L. A. Downs, president of the Illinois Central, was to present a statement on behalf of the southern roads and it was expected that the railroad initial presentation would be concluded on Friday.

At the opening of the session on Wednesday Com-

(*Continued on page 408*)

Research Has Contributed to Locomotive Fuel Economy*

Report of the Fuel Association embodies a resume of improvements to devices during the past four years

THE Committee on New Locomotive Economy Devices of the International Railway Fuel Association, headed by J. R. Jackson, Missouri Pacific, as chairman, submitted a report to the Association at its recent Chicago meeting embodying a resumé of the work that has been done during the past four years by the railroads' and the manufacturers' research departments in connection with the development and improvement of locomotive devices designed to effect economies in the consumption of fuel. The report was prefaced by a statement to the effect that, due to curtailments in railroad mechanical organizations and an almost complete absence of any new locomotive construction, progress in the development of new locomotive devices and the general application of proven economy devices has been slow and that, as an indirect result of the depression, railroads generally have devoted the period of readjustment to the elimination of wasteful practices and the utilization of existing equipment to the best advantage. The report was limited to a mention of the new developments that have come to the committee's attention since the last report in 1931 the principal ones of which are mentioned in this abstract.

Reduction in Locomotive Boiler Washing by Conditioning and Line Blowing

One of the outstanding achievements in the economic operation of steam locomotives during the past three or four years has been the gradual extension of the practice of conditioning boilers by systematic terminal and line blowing instead of the frequent boiler washings and water changes at terminals, which was thought necessary to prevent foaming where the waters available caused the accumulation of sludge and suspended solids within the boilers after relatively short operating periods.

On many roads it was standard practice to wash boilers or change the water in the boiler at terminals after each trip or round trip over a division. As the result of careful preliminary studies and experimentation it has now become a well established practice to wash boilers on these same territories only every 15 to 30 days instead of every trip and several roads, operating large numbers of locomotives over extensive territories, have established a 30-day washout period for the system. This has gradually been brought about by putting into effect a system of blowing at terminals and on the line sufficient to prevent the accumulation of sludge and to keep the total solids in the boiler waters below the range where trouble from foaming occurs.

The results obtained through systematic terminal and line blowing to replace frequent terminal boiler washings and water changes have been truly remarkable both as regards improvement in the general condition of boilers and in the reduction in the cost of maintaining boilers and the time required at terminals to turn locomotives.

The successful conditioning of locomotive boilers, by proper terminal and line blowing, has been brought about, or is to be realized, by the following general procedure:

(1) Equipping terminals with blow-down boxes or other facilities so that blowing may be safely and conveniently carried out by terminal forces.

(2) Equipping locomotives with blow-off cocks and operating mechanism which can be conveniently operated from the cab seats by engine crews. On passenger and switch locomotives it is desirable to install mufflers so designed and arranged that blowing may be safely done along line of road or in and around terminals.

(3) Establish mandatory schedules, based on experiments or experience for each territory, setting up the minimum blowing (stipulating time blow-off cocks are to be opened) to be performed by terminal forces and engine crews.

(4) Hold the terminal forces responsible for the proper conditioning of the boilers on outbound road engines to insure no trouble from foaming for approximately 25 miles out of originating terminal.

(5) Hold engine crews responsible for condition of boilers on line and for turning engines over to succeeding crews (on through runs) or delivery at terminals in proper condition.

(6) It is desirable to keep a check of the condition of boiler waters on departure and arrival at terminals by the use of hydrometers or other simple means for checking the concentration of boiler water samples.

While it has been found possible to condition locomotive boilers indefinitely by close adherence to the above general procedure and depending solely on the manual use of blow-off cocks by terminal forces and engine crews, considerable progress has been made in the development of automatic apparatus to blow down boilers out on the line to eliminate or to supplement manual blowing by the engine men or to indicate to them when blowing is desirable or necessary. Two forms of apparatus of these classes are being experimented with.

Signal Foam Meter and Electromatic Blowoff

This type of apparatus has been developed and applied to a number of locomotives on several railroads. The apparatus is furnished either to indicate the condition of the boiler water to the engine crew and thus furnish a guide for proper manual blowing (Signal Foam Meter) or, in addition, automatically to blow the boiler as and when needed (Electromatic Blow-off).

The essential features of the apparatus are:

Signal Foammeter — Two electrodes of different lengths extending into the steam space of the boiler and a signal box located in the cab. Electric current is taken from the headlight generator. When the circuit

* Abstract of a report presented at a meeting of the International Railway Fuel Association held at Hotel Sherman, Chicago, September 17 and 18, 1934.

is established by foam around the electrodes (set at predetermined distances above the normal water line) lights in the cab are flashed; a steady yellow light indicates a safe amount of foam or high water in the boiler, and is a warning signal for the engine crew to operate the blow-off cock until the yellow light is extinguished. The flashing of the red light indicates the foam at an unsafe point in the steam space where it might be carried out through the throttle, and this is a signal to the engineer to "ease off" slightly on the throttle to keep the red light from showing steady, and at the same time use the large blow-off valve to extinguish the yellow light.

Electromatic Blow-off—If desired, an electro-pneumatic blow-off cock (1-inch), operated by the current operating the Signal Foammeter, may be installed to relieve the boiler automatically and cause the lights to go out without attention by the crew. The automatic blow-off takes care of ordinary blowing one line which may be supplemented by such use of the manually operated blow-off cocks as the flashing or continued burning of the red light indicates necessary.

Continuous Blow-off—This type of blow-off consists of a small orifice located in the water space near the mud-ring, that discharges continuously. The discharge is usually piped into a muffler or water separator and the steam discharged into the air from the top of the boiler and the water allowed to discharge along the track. This type of blow-off is usually made automatic by providing some form of differential valve which allows the orifice to blow while the main throttle is open and stops the blow with the closure of the throttle.

Developments in Superheaters

The practice of superheating steam locomotives has become so well established that no new locomotives have been built for years without superheaters and the majority of existing locomotives in road service have either had superheaters applied when they were built or added later.

While in the earlier years of superheating a number of designs of superheaters were experimented with and extensively used, in later years the Type A was made standard and the majority of superheated steam locomotives in service in this country today are equipped with it. The later developed Type E heaters have been generally applied to the super power type of steam locomotives constructed during the past several years and have established the advantages of higher superheat temperatures than it is possible to obtain with the older Type A heaters.

After considerable laboratory research, the Superheater Company has developed two experimental designs of units which may be installed in place of the older Type A units with no other change in the boiler than to remove the old and apply the new design of units in their place. The new types have been developed to give more superheating surface and hence higher working superheat temperatures without reducing the capacity or efficiency of the superheater or of the locomotive otherwise.

These new experimental designs are now being tested out for the manufacturer on a few roads to check the results obtained in actual road service against the laboratory tests and to determine which design is to be adopted as standard by the manufacturer. When finally worked out, this development gives promise of a means for improving the performance and economy of existing locomotives through higher superheat temperatures by changing the type of units as renewals become necessary.

C. & N. W. and New Haven Loans Approved by I. C. C.

THE Interstate Commerce Commission has found that the New York, New Haven & Hartford and the Chicago & North Western are not in need of financial reorganization at the present time—a finding necessarily precedent under the law to approval by the commission of loans to railroads by the Reconstruction Finance Corporation. Coincident with this finding, the commission approved loans to both companies with certain conditions and stipulations. Commissioner Mahaffie dissented from the decisions in both cases. Considerable interest has been attached to the outcome of these cases, as indicating the view of the Washington authorities toward the prospects for the future of the railway industry.

The North Western applied for further loans totaling $7,357,000 from the Reconstruction Finance Corporation and for the extension of other loans maturing between now and the end of the year aggregating $12,029,350. The company at the end of July had borrowed $34,793,133 from the Reconstruction Finance Corporation, of which $3,384,000 had been repaid, leaving its net indebtedness to the corporation at $31,409,133. In addition to Reconstruction Finance Corporation loans, the company had outstanding at the end of July loans of $1,914,605 from the Railroad Credit Corporation (of which $500,000 matures next May, the balance maturing October 12); $5,000,000 from Kuhn, Loeb & Co. and associates (maturing October 13); $497,843 from the Sioux City Bridge Company (payable on demand); and $1,360,000 from the PWA (maturing serially from 1937). Two bank loans aggregating $500,000 were paid in August.

From January to June, 1934, the company had a net income deficit after fixed charges of $5,708,465, as compared with a deficit of $7,502,655 in the first six months of 1933. In the last six months of 1933 its deficit was $372,764, which, it is estimated, will rise to $1,891,012 in that period of the present year, on account of the increase in wages effective July 1 and the contribution of $656,000 which the company will have to set aside under the new pension law. Cash requirements, it is estimated, will exceed its present cash plus receipts by $4,696,800 by the end of the year. The new loan is needed to meet interest payments, equipment trust maturities and one-half of a maturing issue of 3½ first mortgage bonds of the Iowa, Minnesota & Northwestern (to be paid half in cash and half in C. & N. W. 4½ per cent general mortgage bonds of 1987). The collateral for the new loan will be an additional $6,024,000 of its first and refunding mortgage series E bonds, due 2037.

The commission concluded, in view of the relation of the company's funded debt to its valuation (347 millions, as compared with 643 millions) and its favorable earnings record prior to the depression, that the company is not in need of financial reorganization in the public interest and that the new loan and extensions from the Reconstruction Finance Corporation should be granted for two years on condition that the loan of $5,000,000 from Kuhn, Loeb & Co. and associates be paid, extended or refinanced for a similar period without accommodation from the Reconstruction Finance Corporation.

In the case of the New Haven, a loan of $6,000,000 from the Reconstruction Finance Corporation was authorized. The company has a loan of $1,000,000 from the Reconstruction Finance Corporation, in addition to a

"work" loan of $651,456, which are secured by collateral of a market value of $2,061,665. In addition, the company has received advances for capital and maintenance purposes totaling $3,440,000 ($7,100,000 authorized) from the Public Works Administration. It has outstanding loans of $3,606,156 from the Railroad Credit Corporation, maturing from December, 1934, to May of next year. The new loan was sought to meet in part indebtedness (taxes largely) totaling $8,437,382 which will arise before the end of the year and which, unless financed in some manner, would leave the company with a deficit of $4,113,000 in its cash account. This estimate does not take into account bank loans totaling $14,900,000 and $1,606,157 from the Railroad Credit Corporation which will fall due before the end of the year, but which the company expects to be able to renew.

As collateral for the $6,000,000 loan the company offered securities of subsidiaries of a market value of $3,360,050 and other securities, on which no quotations were obtainable, valued at $7,835,000, together with a considerable amount of real estate not used for transportation purposes which it is willing to pledge. The commission authorized an initial installment of $2,000,000 on the loan on presentation of the collateral on which quotations were obtainable and the remainder on the deposit of the remainder of that proferred. In deciding that the company was not in need of financial reorganization the commission drew attention to the fact that in the 12 years 1922-33, the company averaged $26,260,865 available for interest whereas these charges averaged $14,223,830. In accepting as collateral securities of some of the New Haven's subsidiaries, the commission also stipulated certain protective features to which the New Haven must agree.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended September 22 totalled 643,120 cars, a decrease of 2,866 cars as compared with the total for the preceding week and of 16,746 cars as compared with the corresponding week of last year. As compared with 1932 this was an increase of 47,516 cars. Miscellaneous freight and livestock showed increases as compared with last year and miscellaneous freight, merchandise, forest products, coal and coke showed increases as compared with the week before. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

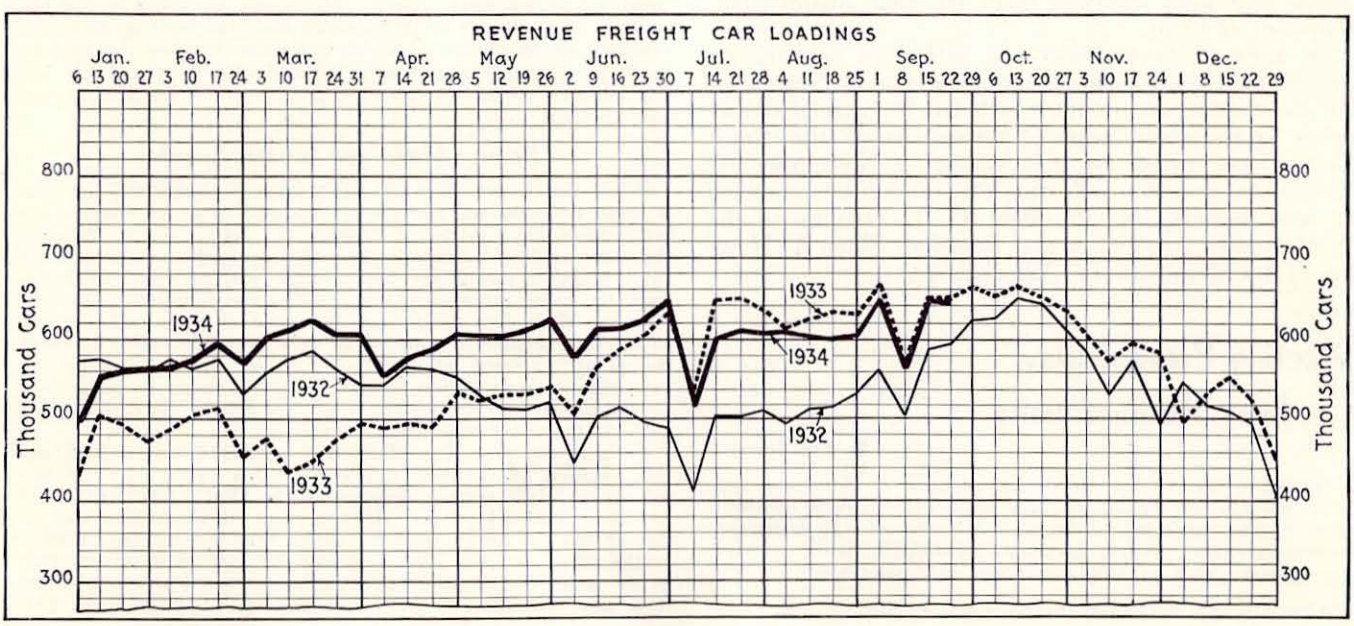
Week Ended Saturday, September 22, 1934

Districts	1934	1933	1932
Eastern	133,622	141,091	131,363
Allegheny	114,562	125,813	107,419
Pocahontas	43,448	48,680	41,421
Southern	88,496	89,713	88,134
Northwestern	99,481	99,831	75,281
Central Western	105,465	99,783	96,744
Southwestern	58,046	54,955	55,242
Total Western Districts	262,992	254,569	227,267
Total All Roads	643,120	659,866	595,604
Commodities			
Grain and Grain Products	33,043	33,806	36,046
Live Stock	32,201	21,702	23,110
Coal	120,385	120,890	113,147
Coke	5,291	6,648	3,700
Forest Products	23,061	25,489	18,577
Ore	24,230	37,986	5,599
Merchandise L.C.L.	164,040	174,839	178,653
Miscellaneous	240,869	238,506	216,772
September 22	643,120	659,866	595,604
September 15	645,986	660,086	587,246
September 8	562,730	577,933	501,537
September 1	645,780	673,778	561,325
August 25	605,516	637,510	537,767
Cumulative Total, 38 Weeks	22,664,152	20,945,494	20,351,034

Car Loading in Canada

Total car loadings in Canada during the week ended September 22 decreased from 53,564 in the previous week to 51,610, but this exceeded last year's total by 4,223, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
September 22, 1934	51,610	19,495
September 15, 1934	53,564	19,923
September 8, 1934	47,679	17,461
September 23, 1933	47,387	19,929
Cumulative Totals for Canada:		
September 22, 1934	1,648,549	829,662
September 23, 1933	1,400,193	694,918
September 24, 1932	1,575,061	723,426



Banquet of the Roadmasters' and Track Supply Associations

Roadmasters Conclude Successful Convention at Chicago

Committee reports and papers by Earl Stimson and Robert Faries feature closing sessions of first meeting in four years

ABSTRACTS of the opening addresses and of two papers and two committee reports presented at the convention of the Roadmasters' and Maintenance of Way Association at the Hotel Stevens, Chicago, on September 18-20, were published in the *Railway Age* of September 29, beginning on page 377. Other features of this meeting are reviewed below. These include reports of committees on Methods of Cleaning Stone Ballast, the Maintenance of Embankments and Highway Crossing Construction, as well as papers by Robert Faries, assistant chief engineer-maintenance, Pennsylvania, and Earl Stimson, chief engineer maintenance, Baltimore & Ohio.

In addition to morning and afternoon sessions on September 18 and 19 and a closing session on September 20, the convention program included the annual dinner given to the Roadmasters' Association by the Track Supply Association on the evening of September 19. The formal program following this dinner was confined to brief remarks by President D. J. Higgins of the Track Supply Association and President Elmer T. Howson of the Roadmasters' Association.

Meeting Present Day Roadway Requirements

By Earl Stimson*

The high point in the use of the roadway on American railroads was reached during the four years 1926 to 1929, inclusive, when it was subjected to an annual traffic of 438,180,048,749 revenue ton-miles, with a maximum of 447,321,561,129 in 1929. During these four years expenditures for maintenance of way also reached a high point, with an average of $857,165,353 and a maximum of $868,581,432 in 1927.

Who would have thought that the traffic handled over the railroads would suddenly shrink to the low level of 233,977,008,859 revenue ton-miles in 1932, and that the roads would be maintained with an expenditure of $322,286,218 in 1933? This represents a decrease of 48 per cent in revenue ton-miles and 63 per cent in maintenance of way expenditures from the averages mentioned above.

During the seven years just preceding the break late in 1929, with the exception of 1924, when the mark was missed by but a small margin, over $800,000,000 was spent each year on maintenance of way, to provide the stiffer, stronger and more permanent roadway that was required for the heavy traffic that prevailed during those years. The result was that at the end of 1929, the railroads of this country had been built up to a high standard of maintenance, which has made possible the maintenance of the roads to an adequate standard with remarkably low expenditures during the ensuing four years of curtailed traffic and earnings.

Heavier Loads and Greater Speeds

While the volume of traffic has decreased greatly and has thus lessened the wear and tear on the roadway structure, the average wheel-loads have increased through the retirement of much of the older and lighter equipment. Moreover, there is a tendency toward higher speeds for both freight and passenger trains to meet the competition of motor vehicles and airplanes. To provide for these new conditions, the same strength and stiffness of track structure are required as were found necessary to carry the greater volume of traffic of former years. In fact, to meet the demands of the increasing speeds, much is being done to strengthen and stiffen the track to give a smooth running surface with less maintenance expense.

Perhaps the most important step in this direction has been the adoption of the new rail sections that went into use this year—the 131-lb. section superseding the 130-lb. section, and the 112-lb. section taking the place of the 110-lb. section and on some roads the 100-lb. section. These new sections add stiffness to the track, but the big advantage they afford is the increase in the depth of the joint bars, giving increased strength where it is most needed. If we could develop a perfect joint that

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would be as strong as the full unbroken section of the rail, or if the joints could be eliminated entirely, the problem of track maintenance would be simple. The constant study being given the rail joint problem and the progressive improvement that is being made in design and manufacture certainly will result ultimately in something approaching the ideal.

In connection with the work of the A.R.E.A. Committee on Stresses in Railroad Track under the direction of Dr. A. N. Talbot, an exhaustive investigation of joint bars was made, and Dr. Talbot's "G" section resulted. This "G" section is of the toeless type with the properties of the head and base well balanced. It gives the maximum strength for the weight of metal provided within the limitations of the fishing space. This design gives a high percentage of strength as compared to the full rail section and, with some modification, is now in extensive use, especially with the new 131-lb. and 112-lb. sections. It is anticipated that it will give excellent results.

Longer Rails

Rail joints have been eliminated entirely in some cases by welding the rails together at the ends in locations where they are protected from the sun, as in paved streets and in tunnels where the range of temperature changes is limited. For tracks where the entire rail is exposed to the sun, this method has not been found practical. In some European countries rail of a length of 30 meters (approximately 100 ft.) is in service, and satisfactory results are reported. In this country small amounts of 60-ft. and 66-ft. rail have been laid for experiment. Long rails are obtainable in small quantities only and at additional cost, as the mills are not laid out to produce rail of more than standard length without extra handling. One eastern railroad is making a bolder experiment with two sections of track of about one-half mile each, laid with rails welded together, thus forming in effect a continuous rail. These experiments will be watched with interest, as the results will undoubtedly have influence on future practices.

The length of cars available for loading the rail at the mills has been the determining factor in fixing the standard length of rail. Car lengths have now increased to such an extent as to permit a rail length of 45 ft., which is perhaps the maximum for convenient and economic handling. To go beyond that length will put the manufacturers to heavy expense for alterations of the mills.

To realize the full life expectancy of the treated tie, it is necessary to protect it against mechanical wear. As treated ties have a possible life of 30 years or more, this matter of protecting the tie has been given careful consideration. Best current practice points to a large heavy double-shoulder plate of sufficient bearing area to distribute the load on the ties in such a manner as not to crush the wood. The plate should have a flat bottom to insure uniform bearing and should rest on a carefully adzed bearing surface on the tie. The plate should be held firmly to the tie by lag-screws or spikes. A slight bevel on the plate that cants the rail inward about 1 in 40, is desirable.

The value of rail anchors is too obvious to warrant comment. If enough are used to the rail length, rail creeping can be prevented. The number required may be determined by experience, but four to six to the rail will generally suffice.

Water is the most persistent enemy to roadway maintenance and one against which we wage constant battle. To keep down surfacing and lining costs, which consist entirely of labor, requires a dry, firm roadbed which can be obtained only through the intelligent application of well-known drainage methods.

Better Surface and Line

The prevailing high speeds of both passenger and freight trains call for refinements in the line and surface of the track which involve a uniformity of rail support, and machine tamping has been found to give the best results in obtaining this uniformity of support. The mechanical tamper was one of the first machines adapted to maintenance of way work. Its use has been more than justified by the economies it has effected, thus paving the way for the procession of maintenance of way machines that have followed. The up-to-date maintenance of way man is now thoroughly machine-minded and fully alive to the advantages and economies accruing through the use of machines.

Under the pressure of circumstances, the maintenance man has been thrown on his own resources during the past four years. He has had to get along by fixing up what he had, instead of replacing it with new material. An outstanding example of this is the reconditioning of worn and battered rail and worn frogs, switches and railroad crossings by the welding processes. The re-forming of worn joint bars is another example of reconditioning that is done extensively. By such methods, the life of the material has been extended, so that the purchase of new material has been deferred. As these are major items of maintenance expense, large savings have been made.

One of the most important steps taken to meet present day requirements is the employment of research to solve the technical difficulties encountered, as well as to search for new and better things. Among outstanding examples of railroad research is that on Stresses in Railroad Track, carried on under the direction of Dr. A. N. Talbot and sponsored by the American Railway Engineering Association. Another is the Transverse Fissure investigation now being conducted by the Engineering Experiment Station of the University of Illinois, under the direction of Professor H. F. Moore. This work is sponsored jointly by the Rail Manufacturers' Technical committee and the American Railway Association.

What of the Future?

In the foregoing I have tried to give you a picture of the present day situation. No one can tell what the future will develop. There are indications that the limits of weights of equipment have been reached. The "Zephyrs" with their Diesel electric motors and all-aluminum cars and the experiments with light-weight freight cars, built of aluminum, or high-tensil, rust-resisting steel, at least point in that direction.

With a reduction in the wheel loads, there will at least be no need for a further increase in the weight of rail or any necessity of further strengthening the track. Our problem at present, and for some time to come, is one of economy. The days of a maintenance of way ratio of 12 or 14 per cent of the gross earnings are past. In the future something under 10 per cent will be demanded.

The Maintenance of Embankments

The maintenance of embankments was considered in the report of a committee of which J. P. Corcoran, supervisor, Alton, Bloomington, Ill., was chairman. Part of the report was devoted to a description of such defects in embankments as inadequate roadbed widths, lack of stability and predisposition to erosion, together with analyses of the various causes of these conditions. Many of the defects were ascribed to faulty methods or the use of unsuitable material in construction, aggravated in some instances by ill-advised maintenance practices.

The remainder of the report was concerned with measures designed to correct defects in embankments, as indicated by the following excerpts:

Narrow embankments should be widened, an operation that can be carried on economically in connection with the widening and ditching of cuts. Stepping the old embankment slopes is a preliminary measure of great importance if the filling material is of a nature that is prone to sliding.

It is especially important to avoid conditions that would lead to the formation or aggravation of water pockets. If the fill material to be used is shale, clay or clay soil, none of it should be allowed to remain at an elevation higher than the shoulder of the existing roadbed or higher than the bottom of any existing water pockets, since otherwise the new fill will form a dam along each side of the roadbed that will prevent rain water falling on the roadbed from draining away.

Whenever a new fill is constructed or an old one is raised so as to require new ballast, soft ballast such as cinders or fine pit run gravel should be used until the roadbed has thoroughly settled. No hard ballast should be applied until after the settlement is complete, since otherwise the coarse ballast will press down and mix with the soft material underneath.

Erosion of the slopes can be cured by providing protection against wash. If the slopes are being eroded by water running off the roadbed, special attention should be given to the development of a heavy sod by the growth of suitable grasses or vines, and in severe cases on high fills it may be necessary to plant fast growing shrubs or even willows. Where the erosion results from the cutting action of stream flow along the base of an embankment, the best solution is to divert the ditch or stream to a new channel built far enough away to leave a wide berm between the toe of the embankment slope and the edge of the channel. But in the many locations where this cannot be done, the only solution is to protect the slope with rip rap.

Drainage

By far the most frequent source of trouble is the water that falls on the roadbed as rain or snow and spreads into the fill material through the agency of the water pockets. The

removal of water from water pockets calls for artificial drainage, although the first requisite in dealing with the problem of draining water pockets is a series of soundings to determine the depth of the water pockets, for more failures in drainage jobs have resulted from a failure to reach the bottoms of the pockets than from any other cause. A careful plan should be developed for the placing of lateral drains, choosing the locations and providing a sufficient number of laterals to insure that all the water will be drained off.

In those cases in which a serious water-pocket condition of the embankment has been allowed to go so far that a considerable portion of the entire mass of the embankment is saturated with water, much more comprehensive corrective measures must be taken. In such cases, the survey must extend over the entire embankment, even far down the slopes, and the results of all borings must be carefully tabulated and platted for the purpose of locating the water-charged portions of the fill. With this information available, a plan must be developed for a complete system of drainage which may involve the driving of tunnels under the embankment, from which as many lateral and riser pipes as are necessary must be jacked into the surrounding material for the purpose of drawing off the water. Such measures are expensive, but they comprise the only effective cure of an exceptionally costly and often hazardous condition short of the complete removal and replacement of the embankment.

Discussion

Several speakers emphasized the importance of using a fine rather than a coarse ballast on a new fill for the purpose of avoiding the formation of water pockets. While a number reported unfortunate experiences with roadbeds constructed of unstable materials, there was a reluctance to advocate greater expenditures for the purpose of obtaining more satisfactory material, one speaker going so far as to state that in some cases it may be cheaper to use the material most readily at hand even if this involves an appreciable expenditure for drainage systems.

Is Permanent Track Construction Justified?

By Robert Faries*

A definition of permanent track construction might well be given as follows: "A structure which, notwithstanding the loads, stresses and abuse to which it is subjected, retains its original exact position as to location and elevation and which is composed of materials not affected by wear or the action of the elements." Of course, there is no such known construction. When consideration was first given to track construction, it was proposed to give permanence to the structure by the use of stone blocks as foundations upon which the rails were to rest. This idea was soon abandoned as it was found unsatisfactory even with the extremely light loads of those days. The wood tie and T-rail construction which replaced it has been in general use ever since.

At various times attempts have been made to provide construction of a more permanent type, usually without success, except for some special locations limited in extent. Briefly, these substitutions have consisted of one of the following: Ties of concrete or metal; a concrete slab in place of ties and ballast; concrete slabs as a base upon which to construct the present track consisting of ballast, ties, tie plates and rail; and a few types in which longitudinal members were placed under the rails.

Substitute Ties

The substitute ties are reported upon regularly by the Committee on Ties of the American Railway Engineering Association. My knowledge of the subject is confined to an extensive experiment with concrete ties on the Pennsylvania, which proved unsatisfactory, some of them crushing under the rail, others breaking off at the ends and many of them rotating in the ballast. These defects can be corrected by design and the better concrete it is possible to make today; but our studies of costs, advantages, disadvantages and savings, based upon our present knowledge, indicate a required life that we doubt would be secured. Definite information on this point can be obtained only by extensive tests of an improved design.

Of the forms of concrete slab replacing ties and ballast, the few that have been put in use have been in tunnels and terminal station areas, with the notable exception of the experimental track on the Pere Marquette. There have been several installations in tunnels that have not proved satisfactory. In one case failure was attributed to the fact that the slab was situated directly between the rail and a solid rock foundation, and was shattered by the blows on the rail. In another case the foundation material was of such a soft and yielding nature that the slab settled, resulting in cracks and deterioration. Some of the installations in terminal station areas have proved satisfactory, and the improved type of construction used by the Pere Marquette has proved entirely satisfactory.

The concrete slabs replacing sub-ballast have been confined to few installations of restricted length in locations where roadbed conditions are extremely poor and where it was felt that no cheaper cure could be effected. In most of these locations they have been satisfactory and have resulted in reductions in maintenance costs commensurate with the capital expenditures required.

Cost of Concrete Slabs

I have examined forms of concrete slab construction of the type which replaces ballast and ties; and considering that type which seems to be the most favorable, and dimensioning it for use on a railroad of heavy traffic with present-day axle-loads, I find that it would cost $72,400 per mile. The annual cost of the component parts of this construction, assuming unlimited life for reinforced concrete (interest at six per cent) plus a figure of $170 per mile for minor adjustments about the rail seats or correction of minor settlements and heaving, shows a total annual carrying cost of $4,733. In this calculation, I have assumed 100-lb. rail as sufficient because of the continuous support afforded the rail, although this assumption is subject to very grave doubt. I have estimated the cost of the present form of construction for one mile of track for heavy-traffic territory, with 131-lb. rail, at $32,000 per mile. The annual cost (interest at six per cent) plus a figure of $630 for ballast cleaning and for restoring line and surface, amounts to $3,013, giving a difference of $1,720 annually in favor of the present construction.

I have estimated the saving which may result from decreased train resistance, the data used being taken from actual tests of train resistance in several different locations. This saving will not exceed $225 per mile of track per year on heavy-traffic lines. It is apparent, therefore, that even though such construction would prove permanent for the reinforced concrete component, it is only at such locations where the cost of preserving suitable line and surface is approximately 3½ or 4 times the normal cost that it could be justified, and then only in case other and cheaper means of relieving the expense could not be found.

The necessity for an immediate improvement in the financial condition of the railroads generally is such that I believe a study of what can be done with moderate expenditures to secure large and immediate savings, by making the present form of track structure and roadbed as permanent as possible, will be easier to justify. The extent to which the present track construction can be advanced toward permanence is probably not fully appreciated. This fact should also be recognized when comparing costs and returns as against such costs and returns for special types of construction that are called "permanent" for want of a better name.

The first step in an advance towards permanence is to secure a stabilized roadbed. No matter how permanent the track structure itself, the advantages are completely nullified by a settling embankment. Fortunately, it is in this field that the largest returns can be secured at moderate cost. Roadbed troubles are usually due to the presence of water. The prevention of the flow of surface and ground water to the roadbed, the drainage of water pockets in the roadbed and provision for quickly draining from the track the water that falls upon it will have a far-reaching effect in saving labor, ballast and ballast cleaning, and in eliminating damage to ties caused by frequent tamping.

Expenditures on the Pennsylvania

For one or two years immediately preceding the depression, the Pennsylvania spent substantial sums in a system-wide program of roadbed stabilization. The returns, which have been carefully checked for nearly every one of the individual projects, have already been sufficient to return the investment.

The stabilization of the roadbed itself is the primary requisite for permanent track, no matter what form the ultimate construction may take. Further steps to obtain permanence must, of course, be directed toward some definite form of track structure. Owing to the fact that there has not yet been developed a more permanent form of track that can be financially justified in territory where ordinary maintenance costs prevail, we should examine the present type of track structure to determine what advances towards permanence can be made at moderate cost,

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the returns from which will be both immediate and attractive.

To give the greatest possible permanence to the ballast, there is required, first, ample depth of ballast and proper sub-ballast to distribute the pressure so as to avoid displacement of the sub-ballast or roadbed material; and, second, ample embankment shoulder and ample ballast shoulder. It is my opinion that many loose ties could be avoided if the proper amount of ballast is provided to bed the ties firmly and to prevent them from being worked loose by tamping.

The great step to give permanence to ties was taken when the railroads of this country commenced the general use of treated ties. However, a great deal remains to be done. The prevention of the splitting of ties can be accomplished by several devices now in use or recently developed. The elimination of abrasion under the plate and around the spikes can be accomplished by a better plate and more adequate rail holding construction.

The greatest approach to permanence that can be secured in rail will come about through a general improvement in rail steel, and through precision surface grinding of the joints. Work of this character strikes at the cause of track disturbance and, therefore, is more desirable than work which simply restores.

The increase in the weight and stiffness of rail, with mounting axle loads, is an engineering accomplishment amply justified by experience. The permanence of a track structure is increased by the stiffness of the rail, and where rail is inadequate in stiffness the best step towards improvement is the correction of this deficiency.

Estimating Savings

In applications for authority for capital expenses to cover all the projects and methods which I have mentioned, the presentation of the facts fixing definitely the costs and the resulting savings to be secured requires a great deal of care. The task of estimating the cost of doing the work should not present great difficulty, since units of cost of various operations are pretty well fixed. Estimates of savings are more difficult; it is hard to secure facts, so some persons assume their facts and try to make up the deficiency by logic and reasoning. But this difficulty disappears if the practice is followed of requiring a check of the savings concerning typical projects after they have been completed for a sufficient length of time, and the information thus obtained is used to adjust estimates of savings currently. In some of these cases it is necessary to follow through the service life of materials in test locations in order to arrive at a true figure for savings.

Also related to this question are such subjects as the possible consolidation of railroad lines with attending abandonments; the possible use of lighter equipment; the social question of unemployment; and, finally, the actual inability to make capital expenditures due to the many burdens imposed on railroads generally.

The consolidation problem has been or is being studied fully and those lines affected are generally known. The main arteries of transportation will probably not be greatly affected. The problem presented by a proposed capital expenditure on a line of questionable life should be solved by a consideration of the amount of saving to be secured. It may be possible that even on a line of such character the project may carry such a high percentage of saving as to make it attractive. While there may be profound changes in the methods of carrying out the business of the railroads, it seems inevitable that the traffic of this country in coming years will not only require but will tax the capacity of the great railroad arteries of transportation.

The use of lighter equipment, when it may be established, will to some extent be balanced by an increase in speed. I do not believe that the gross weight (car and lading) of freight cars will be decreased to an appreciable extent.

Methods of Cleaning Stone Ballast

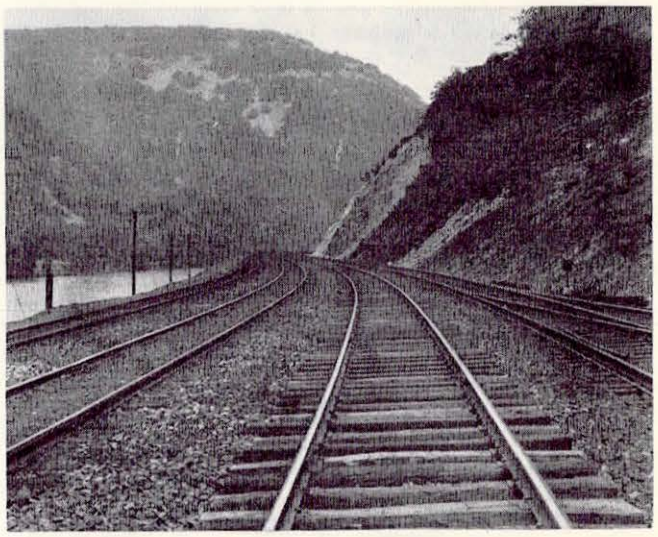
L. J. Drumeller, division engineer, C. & O., Hinton, W. Va., presented the report of the Committee on Cleaning of Stone Ballast, which reviewed the advantages of clean ballast and stated that the intervals between cleanings on the eastern roads, which are the primary users of stone ballast, range from two to eight years. Clean ballast according to the committee:

1. Drains surface water away from the track
2. Reduces the labor of maintaining line and surface
3. Increases the life of rail, ties, fastenings, etc.
4. Improves the general appearance of the right-of-way and, to a large extent, keeps down the dust.

While some space was devoted to a review of manual cleaning practices, the committee disposed of such methods as follows:

Under the very best conditions, the cleaning of stone ballast with either forks or screens is expensive, and in some cases it is considered more economical to throw away the old ballast to a certain depth below the ties and add fresh ballast than attempt to clean the old ballast. This depends, of course, on how old and dirty the ballast is and over what distance it is necessary to haul the new ballast.

The committee then presented descriptions of four types of power ballast cleaners with performance figures, the activities of all of these machines being confined to the cleaning of the intertrack space and the margin ballast. It is the opinion of the committee that it is just as important, for the proper drainage of track, for the ballast in the cribs to be cleaned as for that in the center and on the margins. This opinion is based on the assumption that where track is raised, the old ballast is in most cases tamped under the ties, and new ballast is supplied with which to dress the track. The committee considers it important to get good, clean ballast under the ties.



A Heavy-Traffic Line, Where Ballast Cleaning Is a Formidable Problem

Discussion

In the discussion of this report emphasis was placed on the necessity of adequate drainage of the intertrack spaces. It was also contended that the leakage of dust from coal cars was a major cause of foul ballast and that the doors of coal cars should be inspected to insure a tight fit. Several speakers endorsed the committee's conclusion with respect to the cleaning of ballast in the cribs.

Highway Crossing Construction

An especially informative report was read by J. J. Davis, supervisor of track, E. J. & E., chairman of the Committee on Highway Crossing Construction. This report described the various types of pavements employed by the railways to carry streets and highways across their tracks and outlined the requirements for good results in their use. After reviewing the marked change in the demands imposed on crossings as the result of the growth of highway traffic, the committee presented a discussion of the requirements for good service from which the following was abstracted.

There are many variables which must be considered in selecting

the proper type of crossing for any particular location. The more important of these variables are listed:

1. Railroad traffic density and speed.
2. Highway traffic density and speed.
3. Permanency of the highway construction.
4. Location of the crossing.
5. Condition of the subsoil and drainage.
6. Possible change in design of the track structure.
7. Availability of crossing material.
8. Cost of the crossing on an annual basis.

If the traffic on the railroad is very light and moves at slow speed, and the traffic on the highway is very heavy and fast, a type of crossing which is permanent in character may well be selected, without giving a great deal of consideration to the restrictions which that type of crossing may offer to track maintenance. If, however, the reverse of this situation exists, a type of crossing which will offer the least possible restriction to the maintenance of good line and surface for heavy, high speed, railroad traffic should be selected. All of the other variables will require consideration in the selection of the best type of crossing for the specific condition.

The Types of Crossings

The types of crossings now in most common use and some of the more apparent advantages and disadvantages of the various types are listed below:

Type	*Advantages*	*Disadvantages*
Untreated Plank	Low first cost Easily removed Easy to install Can be made to fit any design of crossing	Short life due to decay Liability of plank to become loose and be caught by dragging equipment Frequent maintenance
Treated Plank	Moderate cost Ease of installation and removal Can be adapted to any design of crossing Comparatively long life	Subject to moderate wear Moderate maintenance
Bituminous	Moderate cost Can be adapted to any design of crossing Easily repaired Will not be greatly damaged by dragging equipment Long life	Requires maintenance in patching worn areas Difficult and expensive to remove for repair of track or correction of line and surface When necessary to remove, very little can be salvaged
Asphalt Pre-formed Plank	Moderately long life Easy to install and remove Comparatively low maintenance	High first cost Rather difficult to remove without damaging
Pre-cast Concrete	Long life Low maintenance cost Can be removed and replaced without damage	High initial cost Heavy to handle
Monolithic Concrete	Long life Low maintenance cost	High first cost Expensive to remove to repair track No salvage when removed to repair track
Metal—Rolled or Cast	Long life Low maintenance cost Can be removed and replaced without damage	High initial cost Requires some attention to keep tight and noiseless Requires special fittings to make repairs when damaged
Armored (Rail type)	Long life Material usually available Can be removed and replaced without much damage to materials Low maintenance	Relatively high first cost Expensive to remove and make repairs to track Cannot be handled with small force

In presenting the above classification, the committee felt called upon to make a distinction with respect to plank crossing.

Comment on Plank Crossing

In considering the merits of the plank crossing it must be remembered that the crossing embraced within this classification range all the way from the primitive type in which a single unsized, untreated plank is provided on each side of each rail, as described above, to the type in which carefully selected, sized and treated planks are installed in accordance with a carefully developed plan that calls for a high class of workmanship. Only a limited proportion of all plank crossings fall within the limits of what may be designated as high-grade construction. Many railroad engineers are of the opinion that the plank crossing, if properly constructed with good materials, provides the best construction, all phases of the crossing problem being considered.

Good Surface on Highway Crossings Has an Important Public-Relations Value

The committee laid special stress on the necessity of putting the track in first class condition before the pavement is installed.

Discussion

It was the general opinion that bituminous crossings and crossings constructed of treated plank having high resistance to abrasion afford the most economical means of providing smooth and satisfactory crossing surfaces. It was brought out that a number of roads are employing monolithic concrete construction for tracks that carry lighter traffic such as on unimportant branch lines and sidings.

Others were in favor of the use of the all-rail type, particularly the newer design of three-rail crossing filled with bituminous materials. It was the general consensus that the maintenance forces must give special attention to the physical condition and smooth riding qualities of highway crossings.

NORFOLK & WESTERN EMPLOYEES who are contributing members of the employees' Relief Fund will "go to the polls" on November 30 to elect five men to represent them on the advisory committee of the fund during 1935. One employee from each of the five electoral districts into which the railroad is divided, will be elected for a one year term beginning January 1. Any member of the Relief Fund may be a candidate, provided his nomination is put in writing, signed by at least ten members of the district from which the nominee is employed and filed with the superintendent of the relief and pension department on or before October 3. All employees who are members of the Fund on November 30, are entitled to vote.

Developments in Railway Fuel Studies*

Smaller cars predicted—Progress reported in performance specifications—Research laboratory favored

By R. L. Lockwood

Director, Section of Purchases, Federal Co-ordinator of Transportation, Washington, D. C.

THE Co-ordinator's office has not had, so far, much contact with the fuel industry. We have made only one tentative recommendation, merely a recommendation that certain features of railway coal purchasing be looked into by the proper organizations in the American Railway Association, and that their findings be reported back to the Co-ordinator for use in formulating definite recommendations.

The Section of Purchases has a somewhat diversified field. Its job is to promote economy in the selection, procurement and application of physical property. Selection includes work on standards and designs. Procurement includes the methods of acquiring property, either by purchase or manufacture. Application covers the actual putting of the material in place, including handling, maintenance and methods of use.

Smaller Cars for Coal

We have had to follow closely the work of the Section of Transportation Service in connection with our work on standardization, particularly in the field of equipment. In order to indicate the effect of transportation studies on our work, I might mention the design of hopper cars. Information already secured by the Section of Transportation Service indicates that in certain important coal centers about 50 per cent of dealer coal comes from the mines in trucks, because the coal dealers, like other merchandisers and many manufacturers, are trying to buy from hand to mouth. They want between 15 and 20 tons in a unit, and will not take a larger unit if they can help it. On the other hand, some railroads are moving train loads of coal. They want the largest unit load they can get. On present information, it appears that the largest coal cars and the smallest one will be most advantageous, and that the intermediate sizes may eventually disappear.

Coal Specifications

It was suggested by the Co-ordinator, when the Section of Purchases was organized, that we look into the whole question of methods of purchasing coal. The only recommendation made was in pursuance of that suggestion and was based largely on the results of an investigation by the Interstate Commerce Commission. We felt that a great deal of work could be done which would ultimately benefit the railroads. The subject fell into two parts, the commercial side, including routing, traffic considerations, etc., and the technical side, dealing with the kinds of coal bought. We took up the technical side first and recommended that the regional co-ordinating committees develop means for selecting coal on a basis of performance. The subject was referred to the Mechanical division, which appointed a committee to work on coal specifications. We felt that, since some branches of the United States Government, such as the Navy Department, certain states and municipalities, and many private industries, notably public utilities, had been buying coal on what really amounted to a performance basis, it might be possible for the railroads to do something of a similar nature. We realized, of course, the enormous diversity in railroad sources and practices. The problem is not as simple as it is for the public utility, for instance. We did not even suggest writing one standard coal specification for all roads, and we had no such idea at any time. What we asked for was that specifications be developed for coal from given districts, or from given groups of mines, so that the railways buying that coal can find out how much actual evaporation they can expect for a dollar. We did not wish to go into mechanical efficiency as, generally speaking, that has nothing to do with the coal.

We obtained information regarding certain railroads that had been trying out such a plan, sometimes in practice, sometimes in the laboratory, and learned enough about the results to conclude that something could be accomplished. The Mechanical Division committee worked on the project for several months, and submitted a report early last June in which it recommended methods for rating coal. The idea was to take a given coal, a general class or kind of coal, and select a base coal which would not necessarily be the best, but a good high-grade average coal suitable for locomotive fuel. The base coal in each class would be rated 100 per cent on its chemical composition and physical characteristics. Each chemical and physical item would carry a certain "weight" in computing the ratio to the base coal for any coal in that class. Certain industrial specifications and performance records indicated that while 100-per cent coal from one district might be quite different from 100-per cent coal from another, 110-per cent or a 75-per cent coal from the two districts would have about the same performance ratios to each other as the base coal from the same two districts.

The General committee of the Mechanical division approved the recommendation of the subcommittee and the recommendation included a formula for adding and deducting percentages, based on variations in the physical and chemical properties of the coal. It also included a formula for adjusting the final cost by adding the cost f.o.b. mine and the transportation cost, including off-line and on-line transportation, and dividing the total by the percentage of rating, so that adjusted costs at the coaling station would be on a comparable basis.

The recommendations was then referred to the Purchases and Stores division which has held two meetings on it. The Purchases and Stores division has not agreed entirely with the Mechanical division. The recommendation which was adopted tentatively and recommended to be tried for a time retained the general principles that the Mechanical division recommended, but eliminated quanti-

* From an address before the International Railway Fuel Association in Chicago, September 17, 1934.

tative figures for the base coal, the opinion being held that they should be left to the discretion of the individual railroads. The Purchases and Stores division also recommended that the adjusted cost should be the f.o.b. mine cost plus off-line transportation, divided by the rating, with "due consideration" for on-line transportation. That is the status of the recommendation at present.

It now looks as though the American Railway Association would eventually reach some conclusion which will represent a very considerable advance in the methods of specifying coal. We have done nothing so far with the commercial end of the subject except to gather considerable data. The code situation, of course, affects that quite seriously. The Coal Code committee has not been able to accomplish all they wished, but I think they have accomplished much.

We have also been interested in the use of sized coals, although we have not taken any action on the question. We have records showing the results of the use of sized coals on the road, as well as in laboratory tests. Some of them look promising. We know that certain railroads have tried it and we expect to consider the subject with the Mechanical division as soon as the present project has been completed.

I had occasion not very long ago to read a list of papers presented to the International Railway Fuel Association in almost every year since its organization in 1908, and was much impressed with the scope of the work. I had not realized how far the association had gone into these matters until I read some of the papers.

Manufacturers have developed, on the drawing board, at least, internal-combustion engines up to 3,600 hp. for road use and they have built switching engines in all ranges of horsepower. Many people have felt that the oil-burning steam engine or the internal-combustion engine might develop to the point where oil would supersede coal. We cannot reach that conclusion from the statistics available on coal and oil reserves. It appears that the oil reserves are definitely limited and that coal, even though its cost might be a little more, is the ultimate reserve.

It may be possible today to get more mechanical horsepower per dollar out of the internal-combustion engine than out of a steam engine. We are not sure, however, that this is always going to be true. The processes for cracking oil have developed until the refiners can get almost 100 per cent out of the oil. The demand for distillates has a tendency to use up the fuel oil supply and its consumption is increasing all the time. The probability is that the use of both liquid and solid fuel will slowly increase for the next five to ten years, after which the use of oil, fuel oil at least, will tend to decline and the use of coal to increase.

Almost a year ago, a Committee on Railroad Research was created through the Science Advisory Board of the National Research Council. The committee includes a number of scientists in important industries outside of the railroad field. The regional co-ordinating committees appointed a committee of six railroad presidents to cooperate with that committee. The two committees, functioning as a joint committee, have held several meetings, and a subcommittee has developed recommendations along the lines of research and standardization. It is expected that the two main committees will meet soon and act finally on the report of the subcommittee.

The committee has gathered and analyzed facts regarding the resources, personnel and facilities used for research and allied technical work in large industries in which success has been based on sound and extensive research, development and engineering, and has compared those with similar facilities used by the railroads. I believe the facts will indicate clearly that the technical work of the railroads will never reach the attainable until it can be separated to a large extent from what the manufacturer calls the production end. Most of the standardization work done by railway organizations today is done by committees of men who know their jobs thoroughly; but the committee work is a side issue to them. Furthermore, there has been no authority in the A.R.A. to enforce their findings, except in items required in general interchange.

Some of us believe that if a centralized technical organization can be established by and for the railroads, employing men who are not employed by individual railroads, an organization that will bear the same relation to the railroads that the Bell Telephone laboratories do to the American Telegraph and Telephone Co., the railroads can accomplish a great deal more with less expense and make the results more effective. Such an organization should eventually cover research in pure science, development from such research to actual practice, engineering design with the establishment of standards and provision for keeping those standards up to date, reviewing them and revising them when necessary, the development of sound methods of testing and inspecting materials, and the writing of performance specifications. All of this work falls into the same general class, although each branch differs from the others.

One of the advantages of an organization of this kind may not be immediately apparent. The research facilities of companies outside of the railroad field are wasted to a large extent so far as the railroads are concerned, because there is at present no way of making them available for the benefit of all railroads. Men in many industries which supply railroad materials have said that if there were one central "hopper" into which they could put the results of their technical work, it would cost these industries less than it does now, and in most cases would cost the railroads nothing. The same thing applies to a number of technical and professional societies. They have no one organization to deal with that can make their work effective.

Railroads Ask Rate Increase

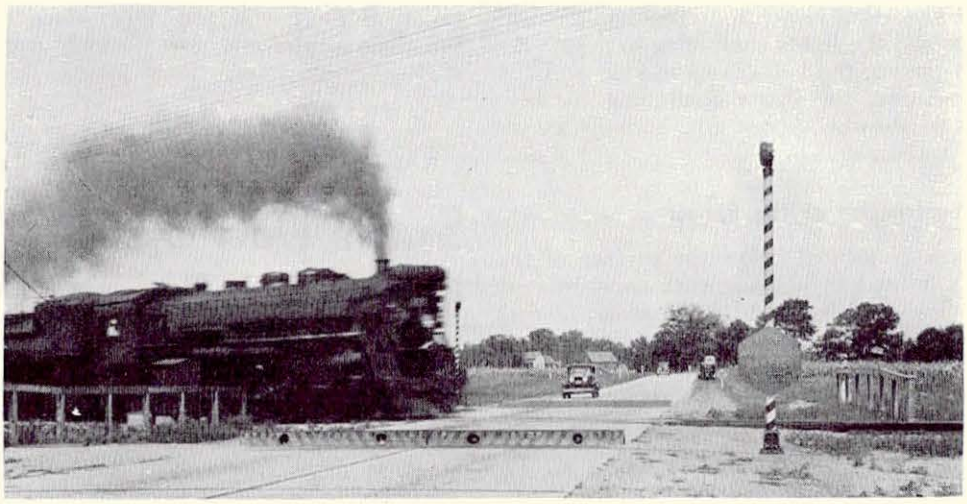
(*Continued from page 398*)

missioner Aitchison asked consideration of a suggestion that had been made by which testimony in the form of affidavits might be sent in by persons who wished to object to some phase of the proposal without the necessity for coming to Washington, with the understanding that it would not be made a part of the record if any party demanded the right to cross-examine on any part of the affidavit unless the person offering it were willing to appear for cross-examination. Some representatives of shippers said they would be as much interested in knowing what might be put into the record in this way as the railroads would be. Hundreds of people write letters to the commission when important rate proposals are made by the railroads, many of them expressing protests, but under the past practice they have been simply docketed and not considered as a part of the record.

After Mr. Baldwin had been cross-examined by seven different counsel representing the shippers, Commissioner Aitchison suggested that it might be desirable to have a "federal co-ordinator of cross-examiners."

New Form of Highway Crossing Protection

Barrier-type installation on Grand Trunk Western near Valparaiso, Ind., is controlled automatically



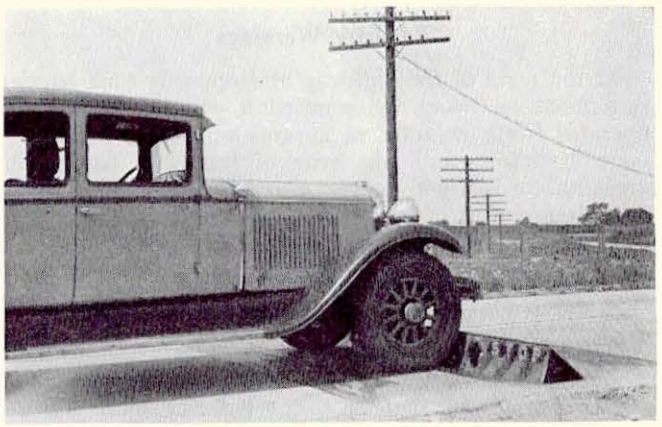
The Barrier Is in the Fully Raised Position 15 Seconds Before the Arrival of a Train

A NEW type of highway crossing protection, consisting of barriers which rise up in the highway, 50 ft. from the railroad track, has been installed at the crossing of Indiana State highway No. 130 with the single-track main line of the Grand Trunk Western about two miles west of Valparaiso, Ind. As this is a new state highway, one of heavy traffic, some type of protection was required and, therefore, with the approval of the State Highway Department, the Indiana Public Service Commission issued an order requiring the installation of highway barriers. The equipment, known as the "Autostop," is similar to a set of barriers which has been under test on the Grand Trunk near Detroit since November, 1932.

The main line of the Grand Trunk is double track except for a five-mile section of single track between Valparaiso, and Sedley, in which is located this highway crossing. The traffic includes 6 passenger trains and 10 to 15 freight trains daily. A count of the traffic on the highway during August showed an average of 400 trucks and 1,100 passenger automobiles on week days and 200 trucks and 1,800 automobiles on Sundays.

General Features of Device

The barrier installation was placed in service on August 8. It consists of two barriers, one on each side of the railroad, which rise up when a train approaches. Each set is operated by an electric motor controlled automatically by track circuits, the same as for flashing-light signals. When a train enters the control section, the warning bell starts to ring and each barrier rises to a height of 4 in., stopping at this point for a period of 10 sec., during which time four flashing red lights and five button-type reflector STOP signs are displayed on this section of each barrier. In case an automobile, approaching from either direction, strikes the device during this period, the barrier is depressed to the level of the pavement by the wheels of the vehicle and the car rides over without harm to the device or to the vehicle. When the 10-sec. period has elapsed, the barrier rises to its full height of 10 in., a surface curved to approximate that of the wheels of an automobile being presented on the approach side, as shown in the illustration. If an automobile happens to be on the track side of the barrier when the device is at full height, the front wheels of the car ride up on the sloping plate of the track side, pushing the barrier down to the level of the highway so that the car can ride over it, after which the barrier rises again



The Tires of an Automobile Strike the Curved Surface of the Barrier

by spring action. Conversely, if an automobile traveling toward the track, strikes the barrier when in the raised position, the front wheels strike the curved surface, the tires acting as a cushion to stop the car and throw it backward and upward, thus blocking approach to the crossing. It is said that a five-passenger sedan, weighing 4,000 lb., with passengers weighing 900 lb., has been driven against the barrier at a speed of 30 m.p.h. with no injury to the passengers or the car.

The track circuits for the control of the protection provide for the warning starting 30 sec. before the arrival of the fastest passenger train, and for the barrier to be at the fully raised position 15 sec. before the train arrives. The barrier remains in the fully raised position until the rear of the train clears the crossing, the bell continuing to ring and the lights continuing to flash. As soon as the train passes, the bell ceases to ring and the barrier starts to lower, the lights continuing to flash until the barrier is down. About five seconds is required to lower the barrier.

Construction of the Barrier

The entire device is located below the surface of the pavement, and is housed in a framework consisting of two steel beams 18-in. high, set 16½ in. apart. Cross members and braces are welded in place, the frame being open at the top and bottom.

The barrier itself—the part that rises above the level of the highway—is constructed in sections 10 ft. long, each of which extends half way across the highway. Each section is hinged to swing upward, as shown in the illustration, the movable sections being counterbalanced by helical springs, power being used to operate the device both up and down. The worm gear which moves the operating rod in and out is driven through a gear reduction by a ½-hp. 32-volt General Electric d-c motor, which operates at 1,725 r.p.m.

An interlocking relay at the crossing, controlled indirectly by the track circuits, controls secondary relays which in turn control the panels located in the pits at the ends of the barriers. The signal relays, flasher relays, rectifiers and transformer power-off relays were furnished by the Union Switch & Signal Co.

The power supply to the secondary control circuits on the panels and to the operating motors consists of a 16-cell Exide Type-EMGO-8 lead storage battery which is located in the battery compartment of the instrument house. This battery is on a floating charge through a rectifier which operates from the 110-volt a.-c. line. With this arrangement of power supply, the operation of the Autostop is not dependent upon the continuity of the a-c. line.

Auxiliary Warnings

At the right of the highway and opposite each barrier is a mast on which is mounted a warning bell which operates from the time an approaching train enters the control section until the rear of the train passes the crossing. Also mounted on this mast is a 30-in. hexagonal sign with the words "Automatic Barrier" and an arrow pointing to the barrier, in reflector buttons on a yellow background. Mounted at the right of the highway approaching the crossing from each direction are certain signs at different distances from the crossing. All of these signs are in black letters on a yellow background, and the letters are fitted with reflector buttons. At a distance of 800 ft. from the crossing there is a 24-in. sign with 7-in. letters reading "Slow Down." At 400 ft. there is a sign reading "Expect Quick Stop," the first word being in 6-in. letters and the remainder in 7-in. letters. At the 350-ft. point, there is a standard "RR" approach warning sign, which is installed to comply with the law. At the 200-ft. point there is a standard highway "SLOW" sign.

A check of operations since the installation was placed in service shows that an automobile runs over a barrier in the hesitation position about once each week, but that no car or truck has failed to stop short of the barrier when it was in the fully-raised position.

The Autostop barrier, manufactured by the Evans Products Company, Detroit, Mich., was installed under the jurisdiction of P. D. Fitzpatrick, chief engineer of the Grand Trunk Western railroad, and under the supervision of W. L. Dayton, superintendent of signals, the signaling control and power supply equipment being installed by signal department forces.

Simple Duct System for Air Conditioning

THE most uniform air and temperature distribution in air-conditioned railroad cars is obtained by means of a distribution system using longitudinal ducts extending along both sides of the car. The installation of these ducts, particularly in existing cars, involves considerable expense and labor. To minimize this the Safety Car Heating & Lighting Company, New Haven, Conn., has developed a novel design for producing distributing ducts. The Inside Louvre Duct, as it is called, has been installed in fourteen de luxe coaches and two diners on the Erie.

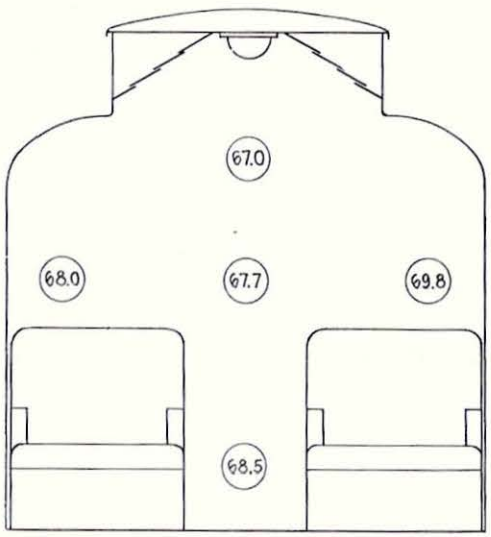
Interior of One of the Erie De Luxe Coaches

The duct is applied to the inside of the clerestory of the car. It is of triangular section and is formed by the application of a series of narrow plates running lengthwise of the car. These plates form one side of the duct and the vertical portion of the roof and ceiling of the car serve as the other two sides. The plates or louvres are so arranged that narrow openings exist between adjacent plates. The air from the conditioning unit passes along the duct and through these openings to the body of the car. The ducts are supplied finished to

match the interior finish of the car and all parts are pre-cut to fit the individual installations.

The insulation is first applied to the ceiling and sides of car and supports for the louvres are then applied, spaced to coincide with ceiling panel strips, or if ceiling is not panelled, at other suitable supporting positions. The louvres are then applied to the supports by machine screws and the joints and screw heads are covered by ornamental cover strips which form a continuation of the ceiling panelling. Since the entire duct is supported by screws and toggle bolts, the only necessary work to be done in installing is the drilling of the screw holes, and the cutting of openings in the bulkhead sheet for the passage of air from the air conditioner into the ducts.

In order that the air flow from the ducts may be at right angles to the center line of the car, the openings



Cross Section of a Car Showing the Location of the Ducts and Louvre Openings—Numbers in Circles Indicate Lateral Temperature Distribution During Tests

between the louvres are supplied with deflectors which give the air the proper direction when it issues from the opening.

To secure uniform distribution of air at all locations along the length of the car, the volume of air discharged at any location may be adjusted by means of strips of felt applied to the lower edges of the louvres; the felt strips close the openings at the point where they are applied.

Tests Showed a Uniform Temperature Distribution

Tests made in a coach equipped with the duct showed a uniform temperature distribution. The greatest difference in the temperature observed at eleven points at the breathing line was 2.8 deg. F. while the maximum variation at seventeen points throughout the car was 3.5 deg. F.

The temperature at the various points is a fair measure of the uniformity of distribution of the air, and an indication of the absence of drafts. This was confirmed by observation.

The advantages claimed for this duct distribution system are as follows: it is readily applied to existing cars, no alteration of car structure is required, no relocation of lighting fixtures is required, no refinishing is necessary after installation, installation and material costs are low, temperature and air distribution are uniform, duct outlet velocity is low and there is little refrigeration loss in the ducts.

Odds and Ends . . .

Dead Man Alive

Murray Brown, local attorney for the Louisville & Nashville at Manchester, Ky., claims the distinction of being the only railway employee who was officially reported "killed in action" during the World War, and lived to tell the tale.

An Arm-Chair Station

The Burlington station in Omaha is the only one, so far as this writer knows, provided with comfortable arm-chairs and carpets instead of the usual long, impersonal looking benches. The waiting room is a cozy place and well patronized.

The Erie Strives to Please

According to reliable sources, the cars referred to in the following letter received by the Erie were moved in 24 hr.:

Erie Railroad,
Meadville, Pa.
Dear Sirs:

Is there any way that I could get the old freight cars removed from in front of my house at Sugar Creek just below where the station stood. They spoil our view of the creek. We cannot see the bathing beauties when they take their bath and we cannot get a sea breeze off the creek. Thanking you in advance for the removal of the cars.

H. C. Garrard, Sugar Creek, Pa.

The Penny Whistle

For some time, Lyle A. Stephenson, a Kansas City insurance agent, has been getting out, in postcard form, a publication known as "The Penny Whistle." In the current issue, and in his customary bizarre spelling, Owner-Editor-Publisher Stephenson expresses the following thought:

Everybody knows, except an armyengineer, that the development of waterpower&inland river transportation won't work. Of course congressmen r elected2office by kiddin their constituents in2 the belief that the Missouri can b navigated,but any gump knows that It's like pourin water in2a rathole. U can build a double track railroad from KC 2 the gulf & haul all the farmer's wheat free for 10 years & hav the road left & it'll cost less than improvin the river & all the present improvemnts"ll be gone in 10 years. All a barge'll do in the Big Muddy is 2 stir up more mud. We've all been just a settin & allowin our railroads 2b hamstrung by a lot of theorists. Isn't it about time for us 2 getup out of our chair&do something for the GREATEST prosperity force inthecountry? We'll hav more folks Levit2-Lyle&INSUR whenuassert ursulf.

Puny Lad at 11, Rail Vet Is 96!

Eighty-five years ago, when James Polk, President of the United States, had no electric light or telephone, an old German doctor in Milwaukee, Wis., was called to look over an 11-year-old boy. "Everything" was the matter with him, especially a palpitating heart. His parents, who had brought him from Burlington, Vt., were worried. He couldn't run or play. He was the weakling of the brood.

The pioneer physician prescribed cognac and tobacco. If his spirit happened to be at a convention in Chicago recently, it must have rubbed its hands and chuckled. For the puny boy was there, at the age of 96 years and 8 months, snappy and bright-eyed, wearing his own hair—not entirely white—and "talking shop" about railroading, in which he still is actively engaged. He tried to keep close to an open window, because he smoked pretty strong tobacco and he didn't like to annoy anybody. And he kept an eye out for his son, a kid of 61, who, he feared, might feel the strain of this "convention stuff."

The clear-skinned gentleman was John M. Horan, who works every day in the Chicago, Milwaukee, St. Paul & Pacific shops at Milwaukee. But the 2,000 delegates to the convention of the Veteran Employees' Association of the road called him "Johnny."

Communications and Books . . .

More on Reading Rooms for Railway Employees

Oroville, Cal.

To the Editor:

Referring again to the subject of railway employee reading rooms, which I discussed previously in the "Communications" columns of the *Railway Age* of February 24:

In the Southwest on two transcontinental railroads there are in close proximity two sub-division yards at each of which are employee quarters with reading room facilities. The undersigned recently was interested in observing conditions there. A composite of the commendable features observed in the two headquarters reading rooms would be an approximate ideal of an attractive layout for employees. For instance:

At the larger headquarters there were 20 or more of a varied assortment of magazines, including the National Geographic and the *Railway Age*. They were protectively bound with covers which had become somewhat worn in service on club cars but which well served their purpose in the reading room. There were 17 copies of recent issues of *Railway Age* neatly stacked on a corner of one of the tables. There were approximately 500 volumes of assorted books in wall cases directly exposed—history, science, biography, classics, travel, crop reports, etc. There were 50 recent issues of railroad employee magazines stacked for ready reference. One feature that much impressd me, and not observed elsewhere, was a Webster's unabridged dictionary stationed midway between the book cases, with two powerful lights directly above it, enabling the one consulting it to see clearly at any hour. It is in need of new binding, as are about 50 of the books, but this need is a tribute as it indicates much use by the employees. At the time of observation—during evening hours—there were about 20 men in the room and nearly all of them were engaged in reading the magazines. A small group played cards. The studious attitude of the men indicated that the casual statement sometimes made to effect that: "Railroad men do not read" is not justified.

In the reading room of the smaller sub-division headquarters, not far distant, is a large fireplace over which there appeared a wooden placard reading: "Knowledge is power." There were about 300 volumes of diversified reading here but only about a half dozen magazines. One feature much in evidence here, however, was the unlocked and open book cases. The books showed much use. In the reading room first referred to the book cases were locked.

Right here is food for thought with respect to reading rooms; and there is some division of opinion regarding it. Should book cases be kept locked? The real answer to this question is that in most public libraries they are not. The reader is permitted to look through the stacks of publications and volumes and select what is required or is appealing, either for immediate reading within the library or for presentaton to the librarian before taking from the building. Of course there is the usual admonishment about theft and mutilation of books.

In nearly all railroad reading rooms, which I have visited, the cases are kept locked. The result is that often a reader, after looking over the books through the glass enclosure, and seeing a volume that appeals to him, finds no librarian readily available to issue the volume; or, the fact that the book is locked in may deter the interested person from following through on his initial impulse to obtain it. The books are kept under lock because of the supposed hazard of theft; but there is no evdience to show that there is a greater percentage of thieves among railroad men than among other members of society.

Of course a book can be stolen but of the countless millions of books in all classes of libraries the percentage of theft is so small that it is virtually nothing. It would be better to let the cases remain open to enable the men to come directly in contact with them. Only rarely would one be stolen.

In my previous letter the volume "The American Railroad in Laboratory" was referred to with a suggestion that it be placed in all railroad reading rooms. It is not in evidence anywhere. Why not? The American Railway Association published it for study by employees and the public—it is authentic and interesting. Why not get it out into the open where it may be made use of? The distribution would not entail any extraordinary effort. The executive or publicity department of each railroad could have a sufficient number of copies printed for distribution to the various reading rooms. The expense involved would be justified by the results.

Edwin Swergal.

New Books

Universal Directory of Railway Officials and Railway Year Book, 1934-1935. Compiled from official sources under the direction of the editor of the Railway Gazette (London). 594 pages, 8½ in. by 5½ in. Bound in cloth. Published by the Directory Publishing Company, Ltd., 33 Tothill street, Westminster, London, England. Price, 20 shillings.

For the second time these two British reference books appear as a consolidated volume, this being the fortieth edition of the widely-used Universal Directory of Railway Officials. The Railway Year Book was consolidated with the Directory last year after the former's thirty-fifth and last edition as a separate publication had appeared in 1932. The book is compiled in its usual form with its comprehensive lists of railways and railway officers and its statistics brought up to date. Among the new features are the completely rewritten section on the electrification of railways throughout the world and a tabulation showing investments of British railways in motor transport companies. The general plan of the book is on a geographical basis and its four indexes are, as usual, conveniently arranged for ready reference. There is the index to countries; the index to statistical and other information; the index to railways and the personal index of railway officials. Also, for the convenience of those who would correspond with foreign railways, there is provided a list in English, French, German and Spanish of approximately comparable titles of railway officers.

America's Capacity to Consume, by Maurice Leven, Harold G. Moulton and Clark Warburton. 272 pages, 8 in. by 5 in. Illustrated with charts. Bound in cloth. Published by the Brookings Institution, Washington, D. C. Price $3.

This is the second volume in a series of four studies dealing with the distribution of wealth and income in relation to economic progress. Considering in turn the income of the American people; the disposition of income; and consumption in relation to production, it analyzes the flow of income arising out of productive operations and the extent of economic progress in this country from 1900 to 1929. While it leaves to subsequent volumes of the series any attempt to consider "the means which may possibly be devised for bringing about such distribution of current annual income as will promote a more efficiently functioning and developing economic organization," it does evolve "some fundamental conclusions" which are set forth as follows:

1. During the so-called "new era" of the gay twenties the United States was not living beyond its means.
2. There has been a tendency, at least during the last decade or so, for the inequality in the distribution of income to be accentuated.
3. Vast potential demands alike for basic commodities and for conventional necessities exist in the unfulfilled wants of the masses of the people, both rural and urban.
4. The United States has not reached a stage of economic development in which it is possible to produce more than the American people as a whole would like to consume.
5. We cannot materially shorten the working day and still produce the quantity of goods and services which the American people aspire to consume.
6. In emphasizing the need of increasing consumption, we must not forget the necessity of simultaneously expanding production.

Like the first volume of the series—America's Capacity to Produce— which was reviewed in the *Railway Age* of September 22, the present work includes comprehensive appendics in which are explained fully all statistical methods and adjustments employed. The two remaining volumes will consider: The Formation of Capital; and Income and Economic Progress.

NEWS

R. R. Owners Association Condemns Wage Agreement

Also speaks up on other aspects of railway situation in latest letter to members

The point of view of the disheartened railway stockholder is reflected vividly in the latest circular letter of the Railroad Owners Association, Washington, D. C., to its members which includes caustic comment on many aspects of the current railway situation. The pension legislation is condemned; railway executives are roundly criticized for agreeing to the restoration of basic wage rates; the Administration's "wages before profit" and crop destruction policies are denounced; the necessity for the rate increase is deplored; and the need for an organization of investors which would protect their interests by "saying it with votes" is emphasized.

Opening with its comment on the pension law the letter calls the measure "only one more evidence of the labor mania existing in Washington in and out of Congress and shows absolute disregard of your interests." Coupling the prospective cost of pensions with the cost of the wage restoration the Association reminds its members that all this comes "at a time when 85 per cent of the railroads are unable to earn their fixed charges before this added and unreasonable burden was placed upon them." The President's Salt Lake City campaign speech is next quoted with a follow-up wish that "President Roosevelt would have given thought to the above remarks before signing the pension bill taxing the companies about $65,000,000, making the situation worse than he described it." The suggestion is added that the investor is apparently the "forgotten man."

To contrast the wage settlement in this country with Canada's handling of the same problem a letter from the general secretary of the Railway Association of Canada is reproduced to give members "evidence of the intelligent handling of these matters by Canadian executives and the government." The action of American railway executives in agreeing to the restoration of basic wage rates is called "inexcusable" and is further characterized as an act which "has brought us several steps nearer to government ownership." It is pointed out in the latter connection that many stockholders are now urging public control as the only way to recover any material part of their original investment. Its opposition to the wage restoration, the letter further contends, is justified because a further decrease would have been proper, and employees would not have dared to strike "because public opinion would have defeated them before they could have started." The "unwise" policy of "wages before profit," it adds, "shows the hand of inexperience with which Washington is now honeycombed. What good can be expected by advancing wages of seven or eight million of laborers and at the same time destroying the income of more millions of small investors?"

Next comes the denunciation of crop destruction, bolstered by an example of the adverse effect of short crops on labor and transportation. The letter then refers to the Association's previous suggestion that the government exchange its higher-rate bonds for new ones bearing a 3 per cent rate and points out the benefit which would accrue to carriers if they could effect such a conversion of their bonds.

The six-hour-day bill which, the Association is informed, will pass if the complexion of the next Congress remains about the same as the last one, would mean "the finish of the railroads." Security holders are accordingly urged to address themselves to senators and representatives on the subject.

The railway executives' proposal to increase rates "about equalling the inexcusable increase in wages they allowed" should be favored by the I.C.C., the Association believes. It calls "unfortunate" the necessity for such an unpopular move but stresses the need of prompt relief. In this latter connection it deplores "the cumbersome methods" of the commission which cause "much delay" and suggest that "a few good business men sitting around a conference table would accomplish as much in a few days as the commission by its procedure does in months." The Association's further opinion on this point is that "fifty per cent of the lawyers now engaged in railroad affairs could be dispensed with to the benefit of the companies."

Upon those stockholders who are advocating government ownership patience is urged "for a time at least in the hope that the government will come to the rescue of your companies," and the Association would further advise "taking up with your senators and congressmen the matter of assisting the railroads, among other things, to enact legislation controlling competitors—bus, truck and intercoastal shipping."

Closing comments stress the importance of the railroad industry in the national economy, the need for a restoration of confidence and the desirability of giving proxies only to a representative committee of stockholders. The proxy is called "the great evil in the corporate world today, as affecting stockholders."

Eastman to Favor Handling of Box Cars on Pool Basis

Will include recommendation in his forthcoming report on car pooling

A recommendation by Co-ordinator Eastman that all box cars be handled on a pool basis will be included in his forthcoming report on car pooling, following a comprehensive study of the subject by his Car Pooling Section, it was stated at the White House on October 3. President Roosevelt said that Mr. Eastman had reported at the meeting of the Executive Council on Tuesday that four important reports are now nearing completion and that pending consideration of these additional reports he had not clarified his own mind sufficiently on the subject to discuss at this time his own plans for recommending transportation legislation for the coming session of Congress. He had been asked as to whether he intended to send a special message to Congress on the subject at an early date and to ask that it be considered as "must" legislation.

The first report expected is that which Mr. Eastman has been promising on the question as to whether forms of transportation in competition with the railroads are subsidized, and, if so, to what extent. He has also suggested the possibility of recommendations for legislation on this point. The next report will deal with the wages and working conditions of carriers other than railroads, with a comparision with railroad wages and working conditions. The third will be on the subject of car pooling, with a recommendation that box cars be handled on a pool basis, and the fourth will be on the handling of passenger traffic.

Pacific Northwest Shippers' Board

Shipments in the territory of the Pacific Northwest Shippers' Advisory Board will increase 8.4 per cent during the last quarter of 1934, as compared with the same quarter last year, according to the predictions of commodity committees at the ninth annual meeting at Portland, Oregon, September 22. It is expected that shipments will total about 146,200 carloads, as compared with 134,773 carloads in the fourth quarter of 1933.

W. A. Baker, traffic manager of the Meier & Frank Company, spoke on the "Need for a Universal Pick-up and Delivery Service." S. J. Wettrick, commerce counselor of Seattle, spoke on government ownership of the railroads.

Purchasing Officers Confer

At a meeting in Chicago on September 20 of the Special Purchasing Group Advisory committee and the chairmen of regional meetings of purchasing officers, plans were perfected for holding meetings under the jurisdiction of the Purchases and Stores division, the first of which will be primarily for organization purposes and have been scheduled as follows:

Eastern Group—October 18, New York City—A. W. Munster, chairman.

Southern Group—October 22, Atlanta, Ga.—J. Bennett, chairman.

Western Group—October 24, Chicago—D. C. Curtis, chairman.

Northwestern Group—October 9, St. Paul, Minn.—C. C. Kyle, chairman.

Southwestern Group—October 16, St. Louis, Mo.—J. H. Lauderdale, chairman.

Far Western Group—October 26, Denver, Colo.—U. K. Hall, chairman.

These meetings are intended to include representatives from all railroad members of the American Railway Association, and the director, Section of Purchases, Federal Co-ordinator, expects to attend or be represented. The meetings will not affect the regular committee procedure of the division, as the discussions will be of a special nature requiring immediate consideration and action.

Lumber Prices

Information transmitted to members of the Purchases and Stores division by E. A. Clifford, chairman of the Forest Products' Code committee of the division, on recent activities of the Lumber code, includes the statement that Order 9-46-A, which was issued on July 16 because of the light demand for building lumber and large accumulations of side cut at the mills, has resulted in new price bulletins in practically all divisions, but that the only items affecting railroads are 1 in. (both No. 1 common and clear) and 2 in. (No. 1 common). Boards, dimension, 1-in. car siding, drop siding and ceiling have been reduced an average of $2 per 1,000 bd. ft. In car framing and sills, the prices on fractional thickness and width in even lengths are from 25 cents to $1 higher than previously, as a result of using constant weights instead of the estimated weights previously used. Prices on odd and fractional lengths are somewhat lower.

Amendment No. 71, issued July 18, provides for grade marking lumber and affects railroad material only when the shipment is not accompanied by an associate certificate of inspection, or is not inspected by railroad representatives at point of shipment. Amendment No. 15, issued July 16, merely gives the administrator greater power. Order 9-59, issued on July 25, requires the issuance of new prices on Southern rotary cut lumber; maple, birch and beech flooring; broom and mop handles; Pacific Coast veneer packages and parts thereof.

Order 9-65, issued July 28, is an interpretation of Article II and Schedule A and definitely places under the jurisdiction of the code the blocking wood manufacturing industry, the wood cutting block industry, the ash handle manufacturing industry, the hickory handle manufacturing industry, the carriage and wagon stock manufacturing industry, the wooden automobile loading block manufacturing industry and the battery separator manufacturing industry.

Mr. Clifford also stated that the Hardwood Manufacturers' Institute has issued Bulletin LCA No. 27-S, which provides that absorption of freight is not permitted in any instance. The price on white oak switch ties is $28 f.o.b. cars mill, and the price, delivered Chicago, which has been established in destination group No. 41 is $47.50.

Under Section B, paragraph 3 (b), provision is made that on all green lumber, delivered prices can be figured on a basis of the air-dried weight which, on thick oak, is 4,800 lb.

Graphic Arts Code

A. W. Munster, vice-president of the Boston & Maine, has been appointed chairman of a special committee to handle several questions as to the Graphic Arts code, and will be assisted by W. C. Atherton, purchasing agent, Pere Marquette, Cleveland; W. W. Griswold, stationer, Chicago, Rock Island & Pacific, Chicago; and James Young, assistant purchasing agent, Pennsylvania, Philadelphia.

Court Argument on Pension Law Set for Next Week

Argument on the railroads' application for an injunction against the operation of the railroad retirement act, tentatively set for October 4 in the supreme court of the District of Columbia, has been postponed to October 10.

Eight Months Net a 1.88 Per Cent Return; August 1.39 Per Cent

Class 1 railroads, for the first eight months of this year, had net railway operating income of $300,702,141 an annual rate of 1.88 per cent on their property investment. For August, net railway operating income was $39,677,337 or at a rate of 1.39 per cent.

Low Rates to World's Fair

Eastern railroads have established a rate of 1 cent a mile for round trip tickets to Chicago during October, the final month of the Century of Progress Exposition. This rate does not apply within a fifty-mile radius of Chicago, and has a five-day limit. The reduction places the Century of Progress rates on Eastern Lines on a parity with the 1-cent-a-mile ten-day limit rate which has been in effect on Western Lines since the opening of the fair.

Western Emergency Feed Rates

New emergency live stock feed rates, now in effect on western roads, provide for a rate of 66⅔ per cent of the standard commercial hay rates for millet, cow pea hay, soy bean and alfalfa hay; and of 50 per cent of the standard hay rates on stover and corn stalks (shredded or not shredded), beet tops, cactus, ensilage, fodder (including cane fodder), straw (including bean or pea), corn cobs and sorghum cane. These emergency rates will expire on December 31.

Treasury Officers Meet

The twenty-eighth annual meeting of the Railway Treasury Officers' Association was held at the Greenbrier Hotel, White Sulphur Springs, W. Va., September 21 and 22.

Reports were heard from standing and special committees. An outstanding achievement reported upon was the planning and establishment during the year of joint credit agencies at a large number of points in the Eastern region common to two or more railroads. This work was undertaken at the instance of the Eastern Regional Co-ordinating Committee with a view to promoting the proper enforcement of credit rules and of bringing about more effective and economical handling of certain phases of credits. A further effort to produce economies resulted in the formation of plans for the establishment of a freight collection bureau at Chicago by carriers entering that city. Of major importance is the study being conducted by a joint committee of accounting and treasury officers of the suggestion by the Federal Co-ordinator of Transportation relating to a proposed clearing house for the settlement of inter-road accounts of the railroads of the United States.

Papers were presented on the subjects of shippers' invoices, future corporate financing, the capital stock tax and silver legislation.

Officers elected for the ensuing year are James Williams, assistant treasurer of the Alton, Chicago, president; Pomeroy Nichols, treasurer, Atlantic Coast Line, Wilmington, N. C., vice-president; and L. W. Cox, secretary and treasurer, Philadelphia (re-elected).

The executive committee, in addition to the president and vice-president, is constituted as follows: F. T. Dickerson, secretary and treasurer, Central of New Jersey; J. Welch, assistant secretary and assistant treasurer, Chicago, Milwaukee, St. Paul and Pacific; J. A. Simpson, treasurer, Southern Pacific; R. P. Ahrens, assistant treasurer, New York Central; George H. Pabst, Jr., treasurer, Pennsylvania; J. G. Walsh, treasurer, Erie; R. E. Connolly, vice-president, secretary and treasurer, Illinois Central; H. B. Fink, assistant treasurer, Atchison, Topeka & Santa Fe; H. Hurst, assistant treasurer, Pennsylvania.

Erie Completes Elmira Viaduct

Completion of a two-mile steel and reinforced concrete viaduct by means of which fifteen grade crossings of the Erie through the business section of Elmira, N. Y., are eliminated, was observed on October 2 with a celebration sponsored by city officials and the Association of Commerce of Elmira. The date of the celebration was also the 85th anniversary of the arrival at Elmira on October 2, 1849, of the first Erie train giving the city rail connections with the eastern seaboard.

In addition to the participants representing Elmira, the October 2 celebration was also attended by a number of New York State and highway commission officials, representatives of nearby cities and officers of the Erie. Work on the grade separation project was commenced about a year ago.

Canadian Roads Oppose Western Grain Rate Cut

Asserting that export rates have been fixed at low levels to permit Canadian producers to compete in world markets, E. P. Flintoft, counsel for the Canadian Pacific, last week in Ottawa opposed before the Dominion Railway Board the move by the provinces of British Columbia and Alberta to have domestic rates on feed grains and mill feeds lowered to the export levels.

It would be unsound to reduce domestic rates on these commodities moving from the Prairies to British Columbia points to the export level, he argued. Also, he claimed, comparisons of domestic rates charged between Eastern Canadian points with those levied on the movement from the Prairies to British Columbia, were misleading. The eastern rate situation was "fundamentally different" from that in the west.

Mr. Flintoft was preceded on the day previous by Thomas Reid, M.P., who argued the case for the applicants, and by A. L. Chard, representing the government of Alberta, who stressed the importance of the reduction to his province because a large proportion of the grains and feeds included in the application originates there. If domestic rates on grains for the British Columbia poultrymen and dairy farmers could be appreciably reduced, Alberta would benefit from the "home market" thus afforded.

"It seems to me that instead of the west getting all the favors in the matter of grain freight rates, the east is getting a large share of them," Mr. Chard remarked in making comparisons of domestic rates prevailing in eastern and western Canada.

Mr. Flintoft gave as one reason for reductions in eastern domestic rates was the effort of the railways to meet "unregulated water competition." He said that if the application were granted, B.C. farmers would be getting a lower rate than farmers in Alberta, Saskatchewan or Manitoba shipping between Prairie points—and this even though operating conditions were more difficult in the mountains than on the Prairies.

The whole rate structure of Eastern Canada had been disrupted by uncontrolled competition among the lake carriers, he said. This was one reason why the railways had reduced domestic grain rates from Fort William to Montreal to 25 cents per 100 lb.

Mr. Chard submitted figures purporting to show that an average train moving from Fort William to Montreal hauled 160 tons less than a similar train moving from Calgary to Vancouver. He admitted that for approximately 40 miles through the mountains, in the Calgary-Vancouver movement it was necessary to employ helper engines, but this, he claimed, did not alter the situation materially.

"It seems to me that instead of the west getting all the favors in the matter of grain rates, the east is getting a large share of them," said Mr. Chard in comparing tolls charged east and west. The export rate on grain from Windsor, Ont., to Saint John, N.B., a distance of 1054 miles, he said, is 18½ cents per 100 lb., while from Castlewood, B. C., to Vancouver, 1,055 miles, the rate is 24 cents. The hearings were concluded this week.

Mexican Unions Forming a Single Organization

Meetings are being held in the labor department in Mexico City for the purpose of arriving at an understanding and forming one single union to cover all the railroad workers in the Mexican Republic. Approximately 50,000 workers will be controlled by the union, if an understanding is reached.

Rail-Water Tours

The Grace Line has recently arranged with the American Express Company Travel Service for the operation of three water-rail all-expense tours to Mexico City. The tours, which will be operated from New York on October 27, November 24 and December 22, will employ the sailings of the Grace Line to Mazatlan, on the west coast of Mexico, and from there the tourist will return by rail, stopping at Mexico City.

Railroads Resume Tax Fight in New Jersey

For the fourth year in succession, New Jersey railroads on September 20 began presenting before the New Jersey State Board of Tax Appeals evidence which they contend upholds their allegation of illegal discrimination in tax assessments approximating $20,000,000.

Eleven roads combine in attacking the assessment which so far has been upheld by the State Tax Board and the State Supreme Court. The 1931 and 1932 cases were appealed to the Federal court and are still pending in that tribunal.

August Locomotive Shipments

August shipments of railroad locomotives from the country's principal manufacturing plants totaled four, as compared with six in July and three in August, 1933, according to reports received by the Bureau of Census, United States Department of Commerce. Unfilled orders at the end of August totaled 136 locomotives, including 76 steam and 60 electric, as compared with unfilled orders for 79 locomotives—4 steam and 75 electric—on August 31, 1933.

These figures do not include data on locomotives produced by railroads in their own shops.

Earnings of Mexican Railways Increase

The net earnings of the National Railways of Mexico increased $9,977,772, or 282.80 per cent during the first six months of 1934, as compared with the same period of 1933. The figures in detail are as follows:

	1934	1933	Inc.	Percent
Gross earn.	$50,683,350	$38,369,892	$12,313,458	32.09
Op. ex.	37,177,430	34,841,744	2,335,686	6.70
Net earn.	13,505,920	3,528,148	9,977,772	282.80

The operating ratio was reduced from 90.80 per cent to 73.35.

Increased Car Loading Estimated by Shippers

Freight car loadings in the fourth quarter of 1934 will be about 2.2 per cent above actual loadings in the same quarter in 1933, according to estimates compiled by the thirteen Shippers' Regional Boards. On the basis of these estimates, freight car loadings of the 29 principal commodities will be 4,618,359 cars in the fourth quarter of 1934, compared with 4,520,780 actual loadings for the same commodities in the corresponding period last year. Ten of the thirteen Shippers' Regional Advisory Boards estimate an increase in the loadings for the fourth quarter of 1934 compared with the same period in 1933 while three estimate a decrease. The tabulation below shows the total loading for each district for the fourth quarter of 1933 the estimated loadings for the fourth quarter of 1934, and the percentage of increase or decrease:

Shippers' Advisory Boards	Actual Loadings 1933	Estimated Loadings 1934	Per Cent Increase
Allegheny	616,191	646,278	4.9 Inc.
Atlantic States	498,523	527,492	5.8 "
Central West	227,050	244,395	7.6 "
New England	114,996	115,578	0.5 "
Northwest	228,203	240,753	5.5 "
Pacific Coast	165,269	180,378	9.1 "
Pacific Northwest	131,170	142,758	8.8 "
Southeast	462,798	467,870	1.1 "
Southwest	323,029	332,484	2.9 "
Trans - Missouri - Kansas	281,394	295,480	5.0 "
Great Lakes	230,737	220,976	4.2 Dec.
Mid-West	679,967	673,056	1.0 "
Ohio Valley	561,453	530,861	5.4 "
Total	4,520,780	4,618,359	2.2 Inc.

Of the 29 commodities covered in the forecast, it is estimated that 16 will show an increase; 12 a decrease, and 1—brick and clay products—will be practically the same as in the fourth quarter in 1933. The 16 for which an increase is estimated are: flour, meal and other mill products; hay, straw and alfalfa; live stock; coal and coke; gravel, sand and stone; lumber and forest products; petroleum and petroleum products; machinery and boilers; cement; lime and plaster; agricultural implements and vehicles other than automobiles; automobiles, trucks and parts; fertilizers of all kinds; paper, paperboard and prepared roofing; chemicals and explosives; canned goods and all canned food products.

Southeast Shippers' Board

Reports presented to the meeting of the Southeast Shippers' Advisory Board at Chattanooga, Tenn., on September 27, indicate a slight increase in aggregate business volume of all basic industries for the fourth quarter of this year, as compared with the corresponding period of 1933. Opportunities offered under the Better Housing program, coupled to wholesale and retail price reductions, will, it is believed, result in an increase of 10 per cent in demand for lumber and forest products. Road projects under way will necessitate 10 per cent greater requirements of such materials as crushed stone, sand, gravel and slag. Although shipments last year, stimulated by C. W. A. programs, were particularly heavy, private and federal enterprises now in promotional stages will, it is anticipated, bring the total movement of brick, cement and iron and steel up to

the 1933 levels. A total of 525,000 head of distressed cattle have been moved from drought-stricken areas in the West into the Southeast for pasturage, and approximately 230,000 head are yet to be moved into that territory.

New England Shippers' Board

The New England Shippers' Advisory Board held its regular meeting at Manchester, N. H., on September 28. For the first 36 weeks of 1934 the New England railroads have enjoyed a freight traffic amounting to 4½ per cent above the same period in 1933. For the fourth quarter of the year, the predictions of the commodity committees indicate a very slight increase over the last quarter of 1933. President William F. Garcelon, presiding, supplemented the report of the cotton committee, by a review of the recent labor difficulties in the textile industry. Other speakers were W. J. McGarry, of the American Railway Association, car service division, and R. V. Fletcher, general counsel of the Association of Railway Executives.

Tie Stocks on September 1 Show Increase

Reports filed with the Railway Tie Association by 14 companies supplying about 85 per cent of the crossties produced by commercial firms show that these companies had 6,797,886 ties on hand on September 1. This was 278,961, or 4.3 per cent, more than these companies had on hand on August 1, and also an increase of 1,312,014, or 23.9 per cent, as compared with the number on hand on September 1, 1933.

Of the ties available on September 1, 4,316,127, or 63.5 per cent, were 8 ft. long and 2,481,759, or 36.5 per cent, were 8 ft. 6 in. long. U-ties for use untreated totaled 510,041, or 7.5 per cent of the total inventory, while oak ties for treatment totaled 4,525,135, or 66.6 per cent of the total. All other species for treatment totaled 1,762,710 ties, or 25.9 per cent of the inventory.

The largest number of ties in stock was reported by the district comprised of Kentucky, Tennessee, Alabama, Mississippi and that part of Louisiana east of the Mississippi river, the number being 2,793,190. The smallest number, 75,359 ties, was reported by the district which includes Michigan, Wisconsin and Minnesota.

N.I.T. League Not to Take Position in Ex Parte 115

Following a meeting of the Executive committee of the National Industrial Traffic League at Chicago on September 25, the chairman of the Executive committee was directed to appoint a special committee of five members from the Executive committee and counsel to attend the hearing at Washington beginning on October 1 and file an appearance on behalf of the league. The league is not at this time taking any position either for or against the application, but will develop such information as may clarify the application of the carriers. After the carriers have presented their case, the committee must make its report to the Executive committee. The league has requested the commission to announce further hearings at representative western points.

I.C.C. Asked to Determine Status of Electric Railways

The Interstate Commerce Commission has assigned for hearing before examiners cases in which the National Mediation Board has requested the commission to determine the status of the Waterloo, Cedar Falls & Northern, the Texas Electric Railway, and the Sacramento Northern under the provision of the railway labor act which exempts from its provisions street, interurban or suburban railways unless they are operated as a part of a general steam-railroad system of transportation.

Meeting of Traffic Clubs

The program of the semi-annual meeting of the Associated Traffic Clubs of America to be held at the Neil House, Columbus, Ohio, on October 16 and 17, is as follows:

Tuesday morning, October 16

Report of Board of Directors—H. A. Palmer, chairman.
Address—Competition in Transportation, By Dr. Marvin L. Fair, professor of transportation, Temple University, Philadelphia, Pa.

Tuesday Afternoon

Report of Membership committee.
Report of Finance committee.
Report of Committee on Education and Research.
Address—The Public Trust Idea of Administration, by Dr. Lewis G. Sorrell, professor of transportation, University of Chicago.

Banquet

Address—British Regulation of Transportation, by C. B. Aitchison, member of the Interstate Commerce Commission.

Wednesday Morning

Election of officers.
Amendment to Article IV of the Constitution.
Discussion of Traffic Club problems and activities.

P.W.A. Allots $200,000 for Adjustment Board Expenses

An allotment of $200,000 to the National Mediation Board to meet expenses of the National Railroad Adjustment Board until June 30, 1935 was announced on September 28 by the Public Works Administration. The allotment, made by direction of an executive order, stipulates that the amounts expended shall be reimbursed to the P.W.A. appropriation if and when Congress makes an appropriation for such expenses. The law creating the adjustment board made no appropriation for its expenses, because it was provided that the railroads and the labor organizations should pay their representatives on the board and that the mediation board should pay for its office employees, but no provision was made for office rent on the assumption that the board would obtain space in a federal building in Chicago.

Wage Conference in Canada

Conferences will be held shortly between representatives of the Canadian railways and their organized employees in regard to the termination on November 1 of the present agreement providing for a 15 per cent reduction in wages throughout most of the services.

J. B. Ward, chairman of the conference committee of the railroad "running trades," announced that in preparing their briefs for submission to the conferences union leaders will draw attention to improved railway earnings in recent months, and will seek the return of part of the pay cuts.

The first cut in wages—one of ten per cent—came into effect about two years ago. Then, late in 1933, when a continuation of poor business led both the principal railways to seek further sources of economy the railways gave notice of an additional 10 per cent reduction. Negotiations were carried on for some time, and reached a deadlock, when Premier Bennett intervened and the parties were led to seek a compromise. The result was an agreement splitting the second 10 per cent cut and making the total cut one of 15 per cent. That agreement will come to an end on November 1.

R. R. Credit Corporation Has Returned $17,696,016

The Railroad Credit Corporation has returned, through liquidating distributions, $17,696,016, or 24 per cent of the emergency freight revenues collected by the participating carriers through March 31, 1933, according to a report as to its financial condition filed by the corporation with the Interstate Commerce Commission. Of this amount, $7,697,422 was in cash, and $9,998,594 in credits on obligations due the Corporation. Ten separate liquidating distributions have been made by The Railroad Credit Corporation, the last one being that made on September 30, 1934, amounting to $734,646, or one per cent. The corporation collected in September $305,767, including $259,135 in reduction of loans, and $46,604 in payment of interest. These collections, added to the balance brought forward from August, were sufficient to make a distribution of one per cent, and leave an available working fund of $209,273 at the end of the month.

I.C.C. Practitioners Hold Annual Meeting at Chicago

The Association of Practitioners before the Interstate Commerce Commission held its fifth annual meeting at Chicago on September 27-28. The program included an address by Walter McFarland, president of the association and general attorney of the Chicago, Burlington & Quincy, on "The Future of Practice Before the Interstate Commerce Commission;" an address by Henry A. Gardner, president of the Chicago Bar Association, on "History and Functions of Bar Associations;" an address by Prof. Fred E. Clark, head of the department of marketing at Northwestern University, on "Economic Planning;" and an address by Elmer A. Smith, general attorney of the Illinois Central, on "Emergency Rates and the Due Process Clause."

Officers elected for the ensuing year are as follows: President, W. H. Chandler, traffic commissioner of the Merchants Association of New York; regional vice-presidents, for the East, Joseph Colquitt, an attorney at Washington; for the West, C. E. Childe, an attorney at Omaha, Neb.; and for the South, W. M. Barrow, an attorney at Baton Rouge, La.; secretary, H. D. Driscoll, an attorney at Washington (re-elected); treasurer, Clarence Miller, general counsel of the American Short Line Railroad Association; and chairman of

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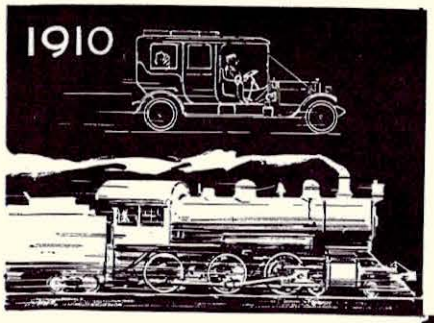

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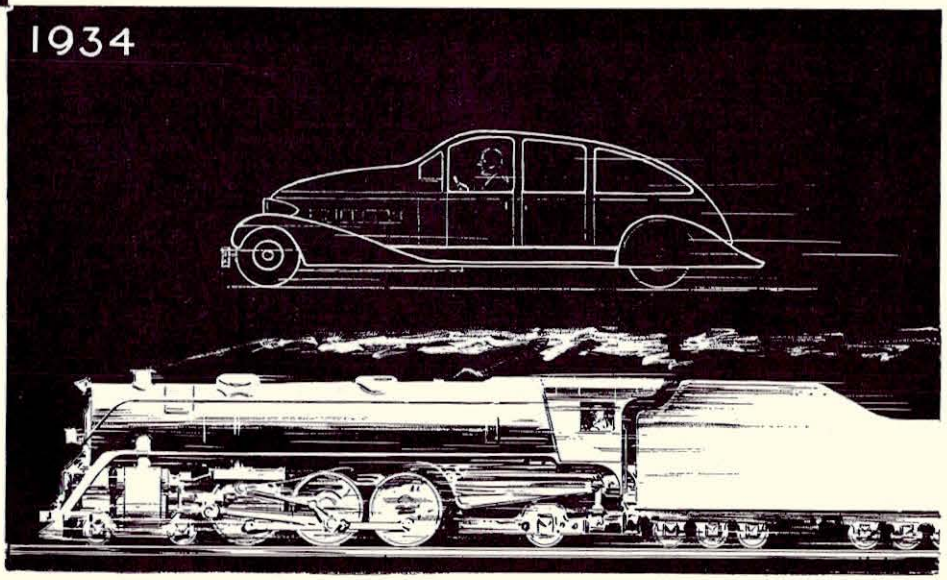

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the executive committee, Elmer A. Smith, general attorney of the Illinois Central.

Equipment on Order

Class I railroads on September 1 had 8,372 new freight cars on order, according to reports received by the Car Service Division of the American Railway Association. On the same day last year, 1,129 new freight cars were on order and on the same date two years ago, there were 1,423. The railroads on September 1 this year also had 35 new steam locomotives on order and 106 electric locomotives. New steam locomotives on order on September 1, 1933, totaled one and on the same date in 1932, there were five. No figures are available to show the number of new electric locomotives on order in previous years.

In the first eight months of 1934, the railroads installed 14,970 new freight cars. In the same period last year, 1,838 new cars were placed in service and for the same period two years ago, the total number installed was 2,477. Six new steam locomotives and ten new electric locomotives were installed in service in the first eight months this year. The railroads in the first eight months of 1933 installed one new steam locomotive, and 35 in the corresponding period in 1932.

Freight cars or locomotives leased or otherwise acquired are not included in the above figures.

Canadian Roads' Net up in August

Net revenues of the Canadian National in August declined $941,855 from August of 1933, with a rise of $1,097,417 in operating expenses as compared with an increase of $155,662 in gross revenues. The month's operating net was $65,276. Gross was $13,532,418, against $13,376,756 a year ago, while operating expenses, including pensions, totaled $13,467,142, against $12,369,725 a year ago.

For the eight months gross operating revenues totaled $107,022,440 and operating expenses were $101,890,179. Net operating revenue for the 1934 period was $5,132,261 as against a net revenue deficit of $1,151,485 in the corresponding period of 1933, a betterment of $6,283,746.

The Canadian Pacific's net operating revenue for August was $1,070,633, as compared with $738,601 in August of last year, an increase of $332,031. Gross for the month amounted to $10,929,992, which contrasts with $9,943,272 in August of last year, an increase of $986,719, while operating expenses, including pensions, at $9,859,359 showed an increase of $654,688 over those for August, 1933.

For the eight months net operating revenues amounted to $10,636,527, against $6,968,122 in the corresponding eight-month period of last year, representing an increase of $3,668,040. Gross for the eight-month period was $78,857,525, showing an increase of $8,048,331, while operating expenses at $68,220,998 recorded an increase of $4,379,927.

Low Fares for Christmas

Low round-trip excursion fares for Christmas and New Year holidays will be offered by lines in the Western, Trans-Continental and Southwestern Passenger Associations. A rate of 2 cents a mile in each direction will apply on travel in sleeping and parlor cars and a rate of 1½ cents a mile in coaches. On transcontinental traffic three classes of fares will prevail: (a) 2 cents a mile in each direction for first-class travel, (b) a fare of 20 per cent less than the first-class rate, for intermediate class travel and (c) a rate of 33⅓ per cent less than the first class rate for coach travel. Tickets will be on sale December 13 to January 1 inclusive, with a return limit of January 15. Stopovers will be allowed.

Trans-Continental railroads have also decided to re-establish for the summer season of 1935 the same low round-trip summer excursion fares westbound to the Pacific Coast and eastbound from the Pacific Coast, to and from all territory, as were in effect during the summer this year. These fares are lower than for more than fifteen years, and the results this summer were so gratifying that it was decided to continue them for another season. Tickets will be on sale from May 15 to October 15 inclusive, all tickets bearing a return limit of October 31. Stopover privileges and optional honoring arrangements will be authorized. Passengers traveling on these tickets to and from the Pacific Coast have the privilege of stopping over at all the National Parks.

Railroad Club Meetings

E. H. DeGroot, Jr., special assistant director, Bureau of Service, Interstate Commerce Commission, will be the speaker at the meeting of the Central Railway Club of Buffalo, on Thursday evening, October 11. His subject will be "The Problem of Demurrage."

The New England Railroad Club will hold its next meeting at the Copley-Plaza Hotel, Boston, on Tuesday, October 9, beginning with a dinner at 6:30 p.m. C. E. Smith, vice-president of the New York, New Haven & Hartford, will speak on current fallacies vs. fundamental facts.

The Western Railway Club will hold its next meeting at Hotel Sherman, Chicago, on Monday evening, October 15. W. F. Thiehoff, general manager of the Chicago, Burlington & Quincy, Lines East, will speak on rail transportation problems and solutions.

The 1934-35 season of the New York Railroad Club will begin on the evening of October 19 at the Auditorium of the Engineering Societies Building, 29 West Thirty-ninth street, New York, when a paper on "What Motive Power for High Speeds?", by G. I. Wright, chief electrical engineer, and P. A. McGee, assistant engineer, of the Reading, will be presented. The paper will be a study of main-line and suburban passenger trains, evaluating the effects of train shape, size and weight on the cost of power with steam, electric and oil-electric motive power at speeds up to 125 m.p.h. It will develop power requirements and estimated costs of operation for all lengths of trains and for a wide range of speed and give cost comparisons of conventional and light-weight trains of the lengths considered.

The members of the Metropolitan Section of the American Society of Mechanical Engineers and the members of the American Institute of Electrical Engineers have been invited to participate in this meeting.

Institute of Transportation

The Institute of Transportation and Maritime Commerce of Seattle, Wash., opened its fall session this week. Two courses, each consisting of eleven sessions, are to be given between now and the middle of December. One of these relates to the fundamental background of transportation rates and the other, traffic management. The object of the Institute is to furnish to transportation and traffic employees an opportunity to supplement their educational training at any stage and to keep informed about important developments in their field of work.

Light, heat and classrooms are furnished free by the Merchants Exchange and the library is housed in the Transportation Club. The Propeller Club and the Maritime Commerce Association, together with a number of transportation companies and other organizations, co-operate. The fee from the students covers only materials used. The classes meet once a week at 7:30 in the evening, for a period of approximately one hour and a half. A week in advance each student is furnished with a mimeographed pamphlet, covering his material for the next session. The discussion is opened with a half-hour lecture by an officer of a transportation company or public organization, and at the end of the discussion period which follows, 10 or 12 minutes are devoted to a rapid written examination on the topic. A second term will be held after the Christmas holidays.

The chairman of the board of the Institute is A. A. Murphy, assistant to the president, Union Pacific System; the vice-chairman is E. C. Bentzen, district manager, McCormick Steamship Company; and the president and educational advisor is Prof. J. E. Gould, Division of Transportation, University of Washington. Prof. Gould would like to learn of other groups giving similar courses.

Dr. Calvin W. Rice Dies

Dr. Calvin Winsor Rice, for the past 28 years secretary of the American Society of Mechanical Engineers, died in New York on Tuesday October 2 of cerebral hemorrhage. Doctor Rice had a large influence on the growth and development of the Society which he served so faithfully. He was constantly on the alert to enhance the standing of engineers and to develop a stronger professional consciousness on their part. In a constructive way he challenged engineers to a larger sense of responsibility for service to the public far beyond that prescribed by professional ethics. He was ever awake to promoting closer and better relations between the engineers of this country and of other nations; indeed, few, if any, engineers have made such a large contribution in this respect. This interest was evidenced not alone in the promotion of international gatherings of engineers and the co-operation of these groups in promoting research, standardization and engineering knowledge, but was also shown in his various activities in encouraging the interchange of engineering students between different nations.

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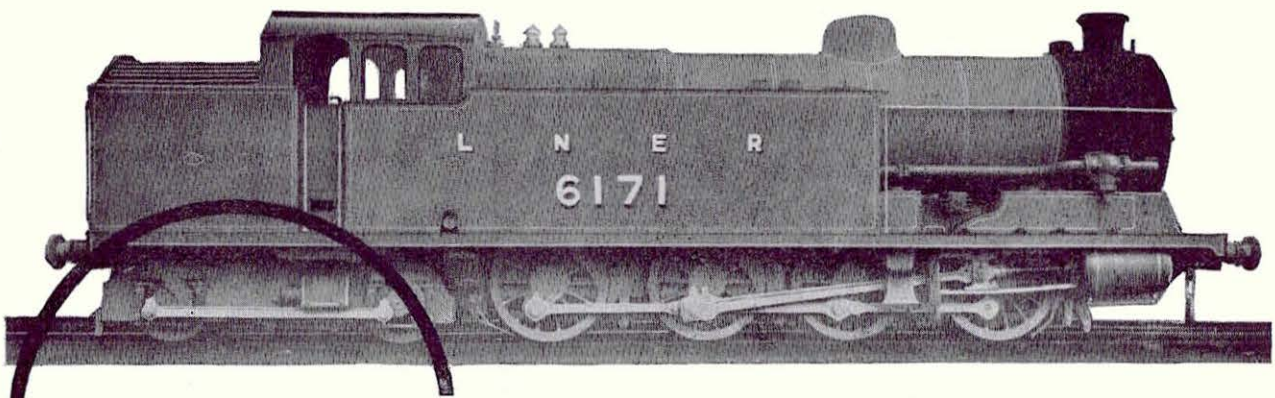
THE LONDON & NORTH EASTERN



USES THE REVERSIBLE BOOSTER

By use of the Reversible Booster the London and North Eastern Railway increased the hauling capacity of its heavy 0-8-4 tank locomotives by 37.8%.

With the Booster, the engine is capable of handling a train of 62 loaded cars up the hump from a dead start and can restart after stopping on the hump without assistance.

The maximum train a non-booster engine of the same type can restart on the hump without assistance is 45 loaded cars.

The Reversible Booster is readily applicable to either the trailer or tender wheels of any locomotive and it is particularly valuable in transfer and hump service.

The close tolerances essential to efficient Booster operation call for genuine repair parts made by Franklin.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

Doctor Rice was born in Winchester, Mass., November 4, 1868, and was graduated from Massachusetts Institute of Technology in 1890. In 1926 he was given an honorary doctor's degree in engineering by the Technische Hochschule in Darmstadt, Germany. He was also the recipient of the Knight Cross of the Order of the White Lion from Czechoslovakia, and a medal of honor from the Verein Deutscher Ingenieure. The citation in the latter case included not only his services to technical, scientific achievement, but "particularly in promoting mutual international interests of engineers of the entire world."

His early experience after leaving college was largely in the electrical field. In recent years he was active in the promotion and upbuilding of the New York Museum of Science and Industry, and he also did much to stimulate interest in similar museums elsewhere.

Meetings & Conventions

The following list gives names of secretaries, date of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—T. L. Burton, Room 3400, Empire State Building, New York, N. Y. Annual meeting, May 2-4, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, 836 S. Michigan Ave., Chicago, Ill. To meet with Air Brake Association, Car Department Officers' Association, International Railroad Master Blacksmiths' Association, International Railway Fuel Association, International Railway General Foremen's Association, Master Boiler Makers' Association and the Traveling Engineers' Association.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, F. T. R., M. & O. R. R., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 S. Michigan Ave., Chicago, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York, N. Y. Annual meeting, October 25-26, 1934, Hotel Chase, St. Louis, Mo.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, Union Station, St. Louis, Mo. Annual meeting, 1935, Chicago, Ill.

AMERICAN ASSOCIATION OF RAILWAY ADVERTISING AGENTS.—E. A. Abbott, Poole Bros., Inc., 85 W. Harrison St., Chicago, Ill. Annual meeting, January 18-19, 1935.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I. & L. Ry., 836 S. Federal St., Chicago, Ill. Annual meeting, October 29-31, 1934, Waldorf-Astoria Hotel, New York, N. Y.

AMERICAN RAILWAY ASSOCIATION.—H. J. Forster, 30 Vesey St., New York, N. Y.

- Division I.—Operating.—J. C. Caviston, 30 Vesey St., New York, N. Y.
- Freight Station Section.—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
- Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
- Protective Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
- Safety Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
- Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York, N. Y. Annual meeting, June 25-27, 1935, Hotel Stevens, Chicago, Ill.
- Division II.—Transportation.—G. W. Covert, 59 E. Van Buren St., Chicago, Ill.
- Division III.—Traffic.—J. Gottschalk, 143 Liberty St., New York, N. Y.
- Division IV.—Engineering.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 12-14, 1935, Palmer House, Chicago, Ill.
- Construction and Maintenance Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 12-14, 1935, Palmer House, Chicago, Ill.
- Electrical Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, October 25, 1934, Bellevue-Stratford Hotel, Philadelphia, Pa.
- Signal Section.—R. H. C. Balliet, 30 Vesey St., New York, N. Y.
- Division V.—Mechanical.—V. R. Hawthorne, 59 E. Van Buren St., Chicago, Ill.
- Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y.
- Division VII.—Freight Claims.—Lewis Pilcher, 59 E. Van Buren St., Chicago, Ill.
- Division VIII.—Motor Transport.—George M. Campbell, 30 Vesey St., New York, N. Y.
- Car Service Division.—C. A. Buch, 17th and H Sts., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago, Ill. Annual meeting, October 16-18, 1934, Chicago, Ill. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—E. H. Gurton, Mgr., Land Settlement and Development, C. N. R., St. Paul, Minn. Semi-annual meeting, December 6-7, 1934, Hotel Sherman, Chicago, Ill.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in co-operation with the American Railway Association, Division IV.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 12-14, 1935, Palmer House, Chicago, Ill.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—J. L. James, L. & N. Employes' Magazine, Louisville, Ky.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C., M., St. P. & P. R. R., 11402 Calumet Ave., Chicago, Ill. Exhibit by Tool Foremen Suppliers' Association. Annual meeting, May 6-8, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—R. E. Schindler, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York, N. Y. Annual meeting, December 3-7, 1934, at 29 W. 39th St. Railroad Division.—Marion B. Richardson, Ahrens & Richardson, 30 Church St., New York, N. Y.

AMERICAN TRANSIT ASSOCIATION.—Guy C. Hecker, 292 Madison Ave., New York, N. Y.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 1427 Eye St., N. W., Washington, D. C. Annual meeting, January 22-24, 1935, Hotel Pennsylvania, New York, N. Y.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—F. L. Johnson, Chief Clerk and Claim Agent, General Claims Department, Alton R. R., 340 W. Harrison St., Chicago, Ill. Annual meeting, 1935, New York, N. Y.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., 1519 Daily News Building, 400 W. Madison St., Chicago, Ill.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, Transportation Building, Washington, D. C.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—J. W. Shoop, The Lehon Company, Oakley Ave., 44th and 45th Sts., Chicago, Ill. Meets with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2276 Wilson Ave., N. D. G., Montreal, Que. Regular meetings, second Monday of each month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS' ASSOCIATION.—A. S. Sternberg, M. C. B. Belt Ry. of Chicago, 7926 S. Morgan St., Chicago, Ill. Annual meeting, May 2-4, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 W. 55 St., Chicago, Ill. Regular meetings, second Monday of each month, except June, July and August, La Salle Hotel, Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF LOS ANGELES.—J. W. Krause, Room 299, 610 S. Main St., Los Angeles, Cal. Club not active at present.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—I. F. Brady, Main and Barton Sts., St. Louis, Mo. Operation suspended indefinitely.

CENTRAL RAILWAY CLUB OF BUFFALO.—M. D. Reed, 1817 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, second Thursday of each month, except June, July and August, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 2920 Utopia Place, Hyde Park, Cincinnati, Ohio. Operation suspended indefinitely.

CLEVELAND RAILWAY CLUB.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings temporarily suspended.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual meeting, May 6-8, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—T. D. Smith, 1660 Old Colony Building, Chicago, Ill. Annual meeting, May 6-8, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn. Annual meeting, May 2-4, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

MASTER BOILER MAKERS' ASSOCIATION.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y. Annual meeting May 6-8, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—James B. Walker, 270 Madison Ave., New York, N. Y. Annual meeting, November 12-15, 1934, Willard Hotel, Washington, D. C.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Suite 322, 910 S. Michigan Ave., Chicago, Ill.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section (See Safety Section, American Railway Association).

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, second Tuesday of each month, except June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—D. W. Pye, 30 Church St., New York, N. Y. Regular meetings, third Friday of each month, except June, July and August, 29 W. 39th St., New York, N. Y.

PACIFIC RAILWAY CLUB.—William S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month, alternately at San Francisco and Oakland, excepting July at Los Angeles and October at Sacramento.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, Transportation Building, Washington, D. C. Annual meeting, 1935, Detroit, Mich.

RAILWAY BUSINESS ASSOCIATION.—P. H. Middleton (Treas. and Asst. Sec.), First National Bank Building, Chicago, Ill. Annual meeting, November, 1934, New York, N. Y.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1941 Oliver Building, Pittsburgh, Pa. Regular meetings, fourth Thursday of each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—Edward Wray, 9 S. Clinton St., Chicago, Ill. Meets with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md. Annual meeting, October 16-17, 1934, Congress Hotel, Chicago, Ill.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1941 Oliver Building, Pittsburgh, Pa. Meets with Mechanical Division, Purchases and Stores Division and Motor Transport Division, American Railway Association.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. R. A. Division I.

RAILWAY TIE ASSOCIATION.—A. S. Fathman 1252 Syndicate Trust Building, St. Louis, Mo.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, 1428 Broad Street Station Building, Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road. Baltimore & Ohio, Pittsburgh, Pa.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Drawer 24, M. P. O., St. Louis, Mo. Meetings temporarily suspended.

SIGNAL APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. R. A. Signal Section.

SOCIETY OF OFFICERS, EASTERN ASSOCIATIONS OF RAILROAD VETERANS.—M. W. Jones, Baltimore & Ohio, Mt. Royal Station, Baltimore, Md. Annual meeting, October 6-7, 1934, Hotel Lafayette, Buffalo, N. Y.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—R. G. Parks, A. B. & C. R. R., Atlanta, Ga.

SUPPLY MEN'S ASSOCIATION.—E. H. Hancock, Treasurer, Louisville Varnish Co., Louisville, Ky. Meets with A. R. A. Division V, Equipment Painting Section.

TOOL FOREMEN SUPPLIERS' ASSOCIATION.—E. E. Caswell, Union Twist Drill Co., 11 S. Clinton St., Chicago, Ill. Meets with American Railway Tool Foremen's Association.

TORONTO RAILWAY CLUB.—N. A. Walford, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, first Friday of each month, except July, August and September, Royal York Hotel, Toronto, Ont.

TRACK SUPPLY ASSOCIATION.—D. J. Higgins, Gardner-Denver Company, Chicago, Ill. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 E. 98th St., Cleveland, Ohio. Annual meeting, May 2-4, 1935, Hotel Sherman, Chicago, Ill. (Tentative).

WESTERN RAILWAY CLUB.—C. L. Emerson, C., M., St. P. & P., Chicago, Ill. Regular meetings, third Monday of each month, except June, July, August and September, Hotel Sherman, Chicago, Ill.

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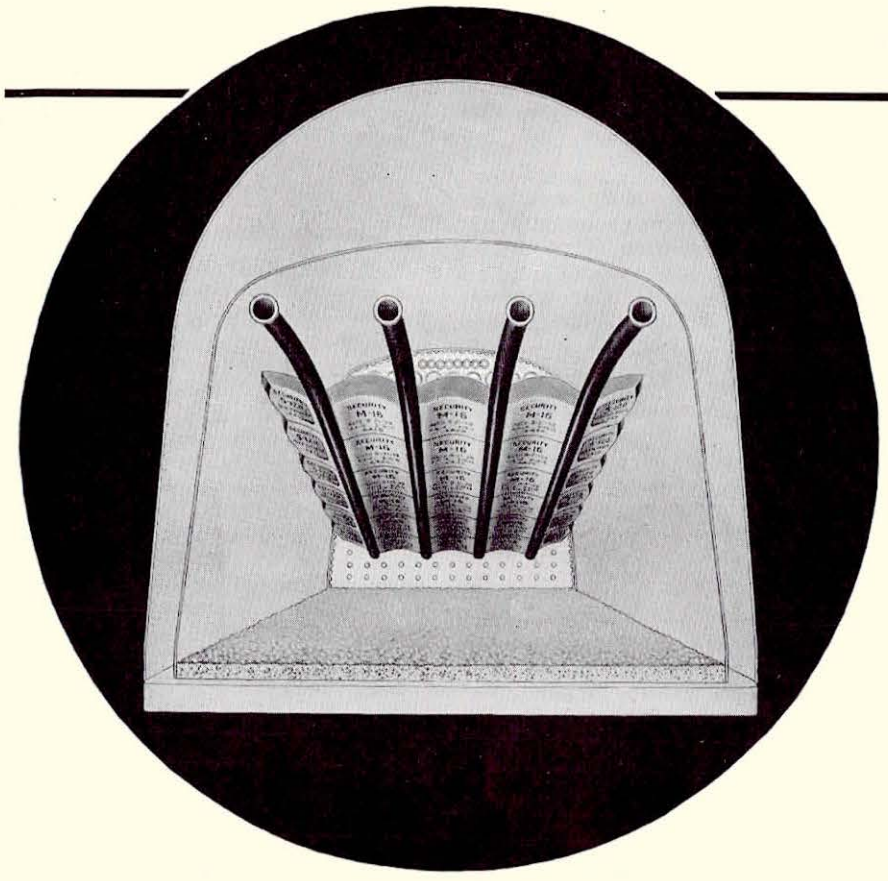

SECURITY ARCH BRICK DESIGN *plus* SECURITY REFRACTORIES

make the Locomotive Arch a success . . . . . .

The Sectional Brick Arch, introduced 25 years ago by the American Arch Company, was the first and only satisfactory arch for locomotive service.

These many years offered opportunity for research work in developing the present standard of the Security Arch. After improvements in design, the supervision of ceramic materials and convenient locations for supply are of equal importance.

To be sure of good Brick from convenient locations American Arch Company supplies the railroads exclusively from the plants listed here.

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Pennsylvania Ohio Kentucky Alabama Missouri

NORTH AMERICAN REFRACTORIES CO.
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Refractory Specialists

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Locomotive Combustion Specialists » » »

Equipment and Supplies

IRON AND STEEL

THE CHICAGO & NORTH WESTERN is inquiring for 185 tons of structural steel for a bridge at DeWitt, Iowa.

THE PENNSYLVANIA has ordered about 600 tons of steel from the American Bridge Company for grade crossing elimination work at Elmira, N. Y.

THE NEW YORK CENTRAL has ordered 500 tons of steel for a bridge to be built at East View, N. Y., from the American Bridge Company.

SIGNALING

THE BOSTON & MAINE has ordered from the Union Switch & Signal Company materials for extensive additions to the interlocking at the Boston Terminal. The chief interlocking, at Tower A, will be enlarged by the addition of 15 levers to the electro-pneumatic machine (now 211 levers). Old Tower B will be discontinued and a new interlocking at Tower C will replace old Towers C and D. Two drawbridges and two junctions, all between the terminus and Tower C, now having mechanical interlockings, will have power apparatus. Tower C will have a Model 14 electro-pneumatic interlocking machine, 99 levers, with searchlight-type color-light dwarf signals. Sixteen levers of this machine will control 13 dual-control low-voltage switch layouts and 25 signals; these to be remotely controlled from Medford and Everett Junctions, which are two and three miles east of the tower. Each of the two drawbridges in this territory will have a six-lever table interlocking. Draw 8 has eight searchlight dwarf signals, and rail locks for its four tracks. The interlocking at Medford Junction and Everett Junction will be all-relay. This order includes 900 relays, 200 copper-oxide rectifiers and three track-models.

MISCELLANEOUS

CHICAGO, BURLINGTON & QUINCY.—The Edward G. Budd Company, Philadelphia, Pa., has placed an order with The Timken Roller Bearing Company, Canton, Ohio, for bearings and boxes to be used on the two new high speed stream-lined "Zephyr" trains which they are building for the Chicago, Burlington & Quincy.

BALTIMORE & OHIO.—For the high-speed stream-lined trains recently ordered for Baltimore & Ohio service, eight of the cars being built by the American Car & Foundry Company will be equipped with Hyatt Roller Bearing journal boxes. Several years ago the B. & O. were among the first to employ anti-friction bearings in railroad service when Hyatt Roller Bearings were installed in one of their engine tenders. Since that time the B. & O. has equipped a number of its passenger train cars with Hyatt journal boxes.

Supply Trade

The Ray Corson-Elkins Company, Denver, Colo., has been appointed loadmaster distributor for the **Bucyrus-Erie Company,** South Milwaukee, Wis., for Colorado.

Harold Smith has been elected vice-president of the **Westinghouse Electric International Company.** Mr. Smith's new duties are in addition to those of his position as vice-president of the **Westinghouse Electric & Manufacturing Company,** with headquarters at New York.

W. A. Nugent, who has been with the **Independent Pneumatic Tool Company,** Chicago, for 20 years, serving recently as sales manager, has been elected vice-president in charge of sales and **Neil C. Hurley, Jr.,** in charge of the distribution of the company's electric tools, has been elected secretary, both with headquarters at Chicago.

R. C. Rudolf, acting auditor of the **American Sheet & Tin Plate Company,** a subsidiary of the **United States Steel Corporation,** has been elected auditor, succeeding **Roland J. Hadly,** who has retired on account of ill health; **M. D. Wells** and **R. C. Cochran** have been appointed assistant auditors, all with headquarters at Pittsburgh, Pa.

Bonnell W. Clark, general manager of the **Westinghouse Electric Supply Company,** has been appointed vice-president and general manager, with headquarters at New York; **H. N. Gansman,** general sales manager, has been appointed a vice-president at New York; and **R. J. Holtermann,** district manager for the company's entire operations west of the Rocky Mountains, with headquarters at San Francisco, Cal., has been appointed a vice-president.

Robert W. Ballentine has been appointed district manager of the **Tyson Roller Bearing Corporation,** Massillon, Ohio, with headquarters at Milwaukee, Wis.; **Hyman Ledeen** has been appointed district manager with offices at San Francisco, Cal., and Los Angeles; **Ben L. Crew, Jr.,** sales engineer has been assigned to the Detroit, Mich., office and **E. L. Farnsworth** has been appointed service sales representative with office at New York.

R. J. Knapp has been appointed representative of the **Westinghouse Air Brake Company** and the **Westinghouse Traction Brake Company,** in charge of its Denver, Colo. office, to succeed **H. L. Fuller,** deceased. Mr. Knapp was for many years employed by the Chicago, Burlington & Quincy successively as locomotive fireman, engineman, fuel supervisor, road foreman of engines and air brake instructor. He entered the employ of the Westinghouse Air Brake Company in 1925, as mechanical expert at Denver. A few months later he was transferred to the Salt Lake City, Utah, office in the same capacity, which position he held at the time of his recent promotion. **P. L. Bradford** has been appointed representative of the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company with headquarters at Boston, Mass., to fill the place left vacant since the death of **F. H. Whitney.** Mr. Bradford entered the employ of the Westinghouse Company in 1919 as mechanical expert at Boston, which position he held continuously until his recent promotion.

Concrete Mixer Code Authority

The National Recovery Administration has approved the following memberships for the code authority of the concrete mixer manufacturing subdivision of the machinery and allied products industry: H. B. Loxterman of the Blaw Knox Company, Blaw Knox, Pa.; W. J. Hamilton of the Hendrick Manufacturing Company, Carbondale, Pa.; H. H. Bunker of the Kerlow Steel Flooring Company, Jersey City, N. J.; B. L. Fralick of the Universal Manufacturing Company, Novi, Mich.; A. E. Sangdahl of the William F. Klemp Company, Chicago; and W. P. Ladd of the Gary Structural Steel Company, Gary, Ind.

Railroad Cross Tie Budget

The code authority for the railroad cross tie division of the lumber and timber products industries has asked the National Recovery Administration for the approval of a budget of $111,316 for the period from April 14 to December 31, 1934. The expenses for districts are estimated as follows: District One, $9,000; district Two, $11,893; districts Three and Five, $49,354; district Four, $11,327; district Six, $18-780; and district Seven, $10,962. The assessment for code funds varies but it is not greater than one cent per tie on production in any case. The administration has asked that comments on the budget be filed with Deputy Administrator A. C. Dixon, Washington, before October 9, 1934.

OBITUARY

James P. Roe, director of research and engineering of the Reading Iron Company, Philadelphia, Pa., died on September 14. Mr. Roe was born on May 19, 1860, at Consett, Wales. At the age of 17 he entered the service of the Consett Iron Company and has been connected with the iron industry since that time. He came to the United States in 1883.

William E. Millhouse, president and treasurer of The Burden Iron Company, Troy, N. Y., who died on September 25, at his home in Troy, was born 70 years ago in London, England. Mr. Millhouse came to this country in 1870 and attended the public schools of Troy. In February, 1876, he entered the employ of The Burden Iron Company, and for more than 58 years had been affiliated with the company having started work at the age of 12 years, as a feeder on one of the swaging machines in its mill, and later working his way up to its presidency He served in various capacities until 1897, when he was appointed head of the company's wages department. In May, 1907, he was appointed paymaster; two years later he was promoted to assist-

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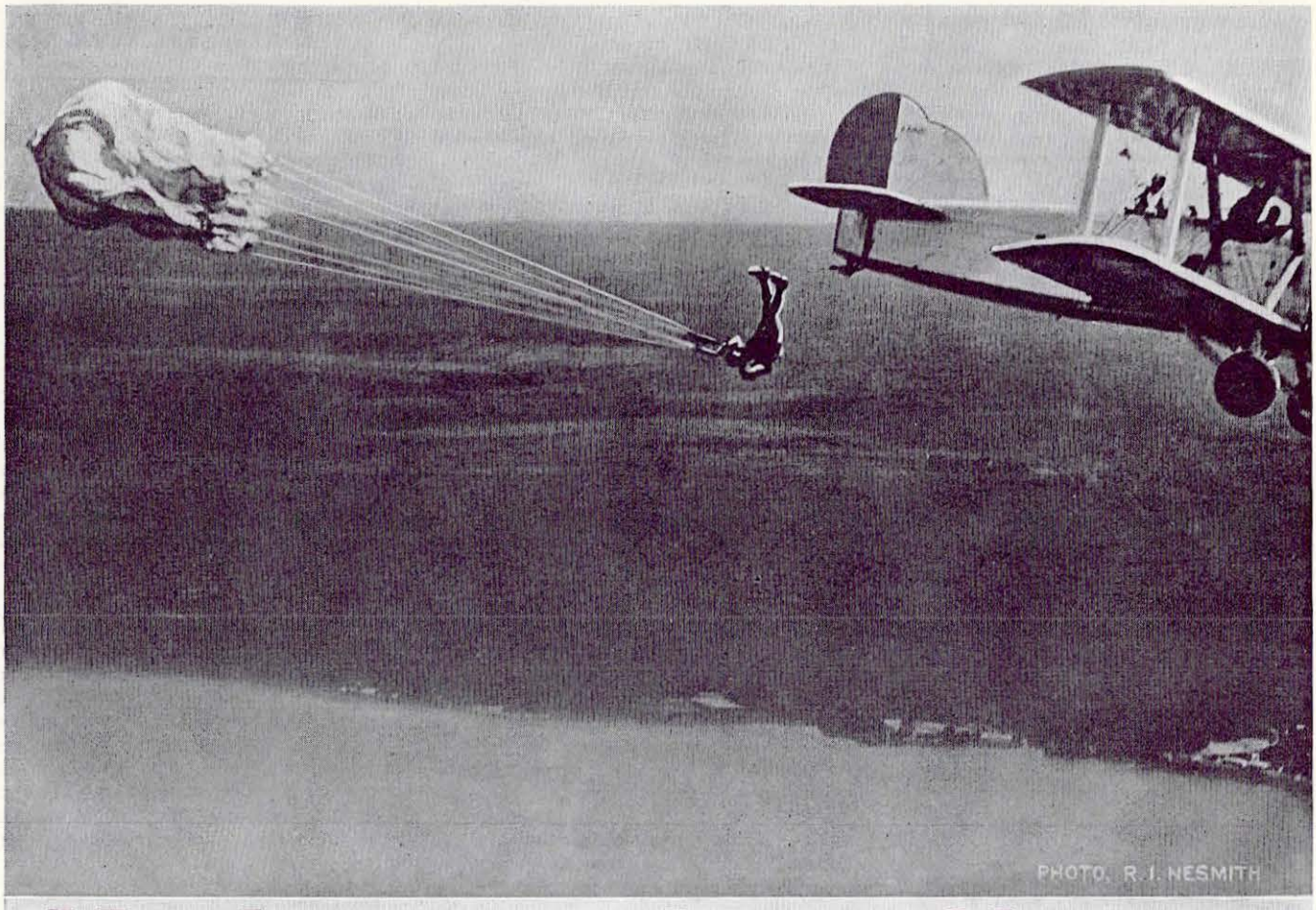

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Poorly maintained superheater units actually are avoidable chances of failures to your train schedules. When a neglected superheater fails, there may be an attendant engine failure.

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Standardize on the Elesco unit remanufacturing service . . . it converts unserviceable units into reconditioned units which are practically equivalent to new units—at a cost of about half that for new units—and it gives assurance against failures in service. *Write for our booklet on this necessary service.*

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ant secretary and the following year assistant manager of its mill On October 22, 1918, Mr. Millhouse was appointed manager of the company serving in that position until June, 1932, when he was elected executive vice-president and since June

William E. Millhouse

of the following year was president of the company. Mr. Millhouse had taken a part in civic affairs, having served as a director of the Troy Chamber of Commerce.

Construction

CHICAGO & NORTH WESTERN. — This company has undertaken the work of replacing the timber pile trestle approach at the north end of its Illinois River bridge at South Pekin, Ill., with deck plate girder spans carried on reinforced concrete pile piers. The structure will have five spans with a total length of nearly 400 ft. A contract for the furnishing and driving of the concrete piles has been awarded to the S. G. Cool Company, Chicago. The work of erecting the steel will be done by company forces.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has entered into an agreement with St. Louis County, Mo., for the construction of a reinforced concrete bridge, 30 ft. long, to carry the railroad's tracks across the Woodson road near Overland, Mo. The cost of the new bridge, which will replace a wooden trestle, will be shared equally by the county and the railroad.

DELAWARE & HUDSON.—The elimination of three grade crossings of this road in the town of Colesville, Broome county, N. Y., has been directed by the New York Public Service Commission. This is to be accomplished at the Coventry road and South Nineveh crossings by carrying the new Coventry road under both the Pennsylvania and Susquehanna divisions of the railroad on opposite sides of Wylie brook and over Wylie brook; the highway will pass under the west portion of the present bridge which carries the Susquehanna division track over the brook. The cost of this project is estimated at $102,800, of which the Department of Public Works will pay the cost of concrete pavement, leaving $94,100 in construction costs. The Harpursville crossing is to be eliminated by the construction of an underpass under the railroad at a point 300 ft. southwest of the existing crossing, at an estimated cost of $16,200.

DETROIT, TOLEDO & IRONTON.—Arrangements have been completed for the reconstruction of a highway subway carrying State Route 110 under the tracks of this company at Napoleon, Ohio, at a cost of about $85,000.

ERIE.—The New York Public Service Commission has approved a plan covering changes in this road's tracks in connection with the elimination of the William and South Ogden street crossings in the village of Sloan, Erie county, N. Y. The estimated cost of the work within its right-of-way is $128,720, which was also approved. The cost of additional tracks estimated at $37,950, is to be paid for by the railroad and it has been authorized to do certain work covering changes in tracks and signals for an amount not to exceed $36,650.

LEHIGH VALLEY.—Bids will be received until 1 o'clock p.m., October 15, by the Lehigh Valley at New York, for the construction of a steel and concrete highway bridge over the tracks of this road, together with approaches and incidental work for the elimination of the grade crossing of Central avenue, at Picton Depot, Clark Township, Union county, N. J.

NEW YORK CENTRAL-ERIE-INTERNATIONAL RAILROADS.—Petitions for rehearings in the proceedings involving the elimination of grade crossings in the cities of North Tonawanda, and Tonawanda, N. Y., have been denied by the New York Public Service Commission. The elimination of several crossings in these cities was directed by the commission last July and the New York Central and Erie railroads were ordered to prepare and submit plans and estimates of cost for the elimination of the crossings designated within one year.

NEW YORK, NEW HAVEN & HARTFORD.—This road has authorized work of carrying out track changes at Allens avenue, Providence, R. I. The estimated cost of the work is $43,500.

PENNSYLVANIA.—The Pennsylvania Public Service Commission has issued an order that the bridge carrying Ridge Pike over the tracks of the Trenton cut-off of the Pennsylvania at a point in Plymouth Township, Montgomery county, Pa., about three-quarters of a mile south of the southerly line of Norristown, and the bridge carrying Ridge Pike over the tracks of the Earnest wye branch of the Pennsylvania in the same township, about 900 ft. farther south be reconstructed and altered. The cost for the reconstruction of the bridge over the tracks of the Trenton cut-off will be about $65,000 and that of the bridge over the wye tracks about $36,550.

ST. LOUIS-SAN FRANCISCO.—The Maxwell Construction Company, Columbus, Kan., has been awarded contracts for the construction of three highway underpasses on the Frisco in Greene county, Mo.

Financial

ALLEGHANY CORPORATION. — *Collateral Trust Bonds.*—This important railroad holding company has defaulted in a $613,300 semi-annual interest payment due on its collateral trust convertible 5 per cent bonds of 1950. The income available for service on the bonds is about $113,258. The New York Stock Exchange has announced the receipt of a notice that the time for the deposit of the bonds under a plan of recapitalization put forward to avert the default had been extended to November 1. If the plan is not declared operative by December 1, when the sixty-day period of grace on the interest payment expires, the bonds must be returned to the owners. Holders of $11,322,000 of the issue of $24,532,000 have deposited their holdings under the plan; which ratio must be increased to 66⅔ per cent of the issue in order to invoke the new bankruptcy law.

BALTIMORE & OHIO.—*Bonds.*—The Interstate Commerce Commission has authorized this company to pledge and repledge until December 31, 1936, all or any part of $3,313,000 of its refunding and general mortgage, series E, 6 per cent bonds as collateral security for notes which it may issue under Section 20a (9) of the Interstate Commerce Act and in substitution for existing collateral for present loans.

BALTIMORE & OHIO.—*Trackage.*—This company has applied to the Interstate Commerce Commission for authority to acquire trackage rights over the Pittsburgh & Lake Erie between McKeesport, Pa., and New Castle Junction, proposing to use its own line for local service.

BANGOR & AROOSTOOK.—*Refunding Divisional Bonds.*—The stockholders of this company have approved the issuance of bonds under its consolidated refunding mortgage to refund divisional mortgage bonds issued or assumed by the company. The new issue is limited to $5,000,000 and will be convertible into common stock at $52.50.

CHESAPEAKE & OHIO. — *Abandonment Application Denied.*—The Interstate Commerce Commission has denied the application of this company for permission to abandon a branch line extending from Eagle Mountain, Va., to Newcastle, 26.4 miles. The Commission in its decision said: "The issue lies between economic injury to a large, sparsely populated, and at present not highly productive territory, and a financial burden upon interstate commerce from the operation of the branch. The computations introduced show that the losses on the branch have been substantial, and the testimony offers no assurance that they will be eliminated in the near future. On the other hand, as the applicant's income statements show, the system operations as a whole have continued profitable throughout the period of the depression. Weighing these issues, it is our conclusion that permission to abandon should not be granted at this time. The applicant, however, should not be required to sustain in-

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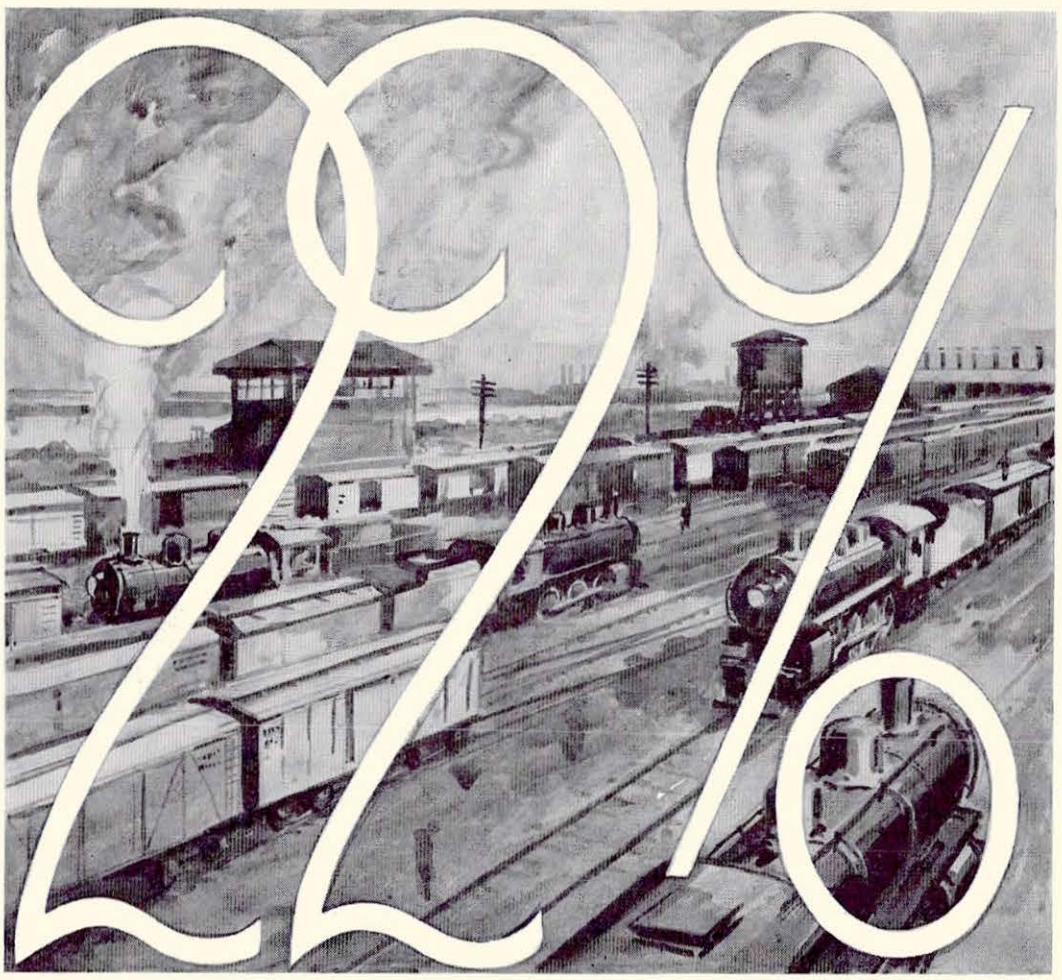
RAILROAD DIESELS FOR RAILROAD MEN



On a certain prominent American road the total transportation yard expense is about 22 per cent of the total operating expenses of the Railroad.

22 per cent is an impressive figure.

And right in the exact field where the Diesel switching locomotive can and does show startling operating economies.

Today, or in fact any day, this new facility merits very careful consideration by all Railroad Officials.

This advertisement is No. 13 of series calling attention to the many factors which, all combined, make the Alco Diesel an outstanding purchase.

AMERICAN LOCOMOTIVE COMPANY

ALCO DIESEL

30 CHURCH STREET · NEW YORK · N.Y.

definitely the loss now being incurred from the branch, and those interested in the service should not expect to retain it unless in future they can furnish traffic sufficiently adequate to maintain and operate the line."

CHICAGO GREAT WESTERN.—*Trackage Rights.*—The Interstate Commerce Commission has authorized this company to operate under trackage rights over about a mile of the Kansas City Southern between Ohio avenue, Kansas City, Kans., and the freight house of the latter company near Hopkins street, Kansas City, Mo., the arrangement being one under which the K. C. S. will handle l.c.l. freight business for the Chicago Great Western. The action was protested by the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express, and Station Employees, which contended that the reduction in forces occasioned by the abandonment of the Great Western of its own facilities was in violation of the Railway Labor Act and the Emergency transportation act of 1933. The commission held, however, that if there were any violation of these acts, the matter should be laid before the board created by that act and not the Interstate Commerce Commission.

CHICAGO UNION STATION.—*Valuation.*—The Interstate Commerce Commission has issued a final valuation report as of 1927 finding a final value for rate-making purposes of $46,540,000. The investment in road and equipment stated in the company's books was $95,211,045. Readjustments required by the commission's accounting examination would reduce this to $87,841,411.

DENVER & RIO GRANDE WESTERN.—*Interest deferred.*—Directors of the Denver & Rio Grande Western, on September 28, voted to defer interest due October 1 on the Rio Grande Western's first four per cent bonds of 1949 and the Denver & Rio Grande Western refunding and improvement five per cent bonds of 1978 and the six per cent bonds of 1974. Further consideration will be given during the period of grace under the indentures, according to an announcement by the company, which for the first issue extends for three months and for the latter two for 90 days.

WESTERN MARYLAND.—*Bonds.*—The Interstate Commerce Commission has authorized this company to continue to pledge with the Railroad Credit Corporation not more than $2,718,000 of its first and refunding mortgage 5½ per cent, series A, bonds as collateral security for notes issued to that Corporation, or notes issued under Section 20a (9) of the Interstate Commerce Act and to pledge not more than $1,659,000 of its first and refunding mortgage 5½ per cent, Series A, bonds and $623,000 of its series AA bonds as collateral security for notes which may be issued under Section 20a (9)—the authority to pledge the entire $5,000,000 of these bonds to expire at the end of 1936.

Dividends Declared

Elmira & Williamsport, $1.15, semi-annually, payable November 1 to holders of record October 20.

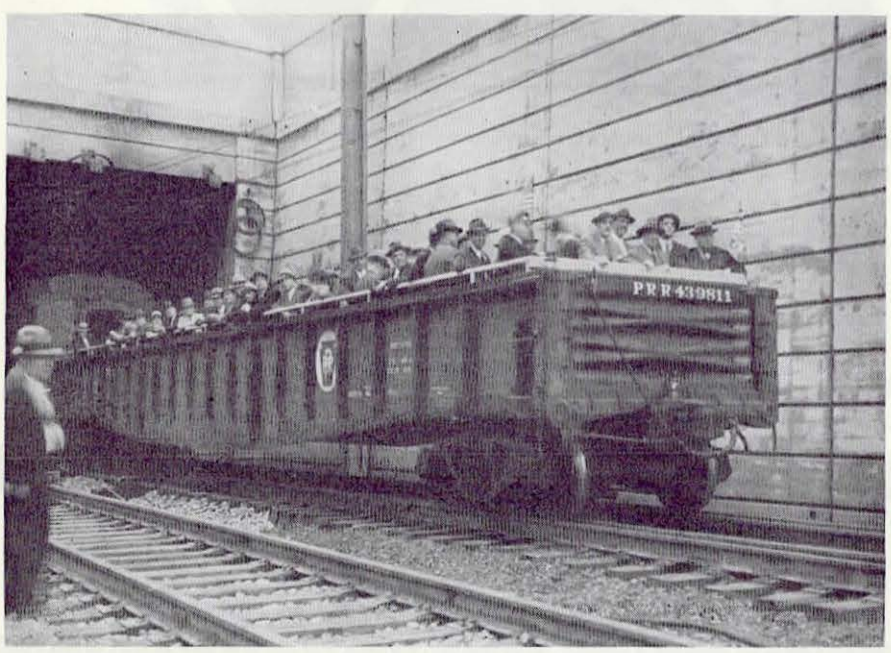
Reading.—Common 50c, quarterly, payable November 8 to holders of record October 11.

Richmond, Fredericksburg & Potomac.—7 Per Cent Guaranteed, $3.50, semi-annually; 6 Per Cent Guaranteed, $3.00, semi-annually, both payable November 1 to holders of record October 30.

Average Prices of Stocks and of Bonds

	Oct. 2	Last week	Last year
Average price of 20 representative railway stocks..	34.71	35.88	38.35
Average price of 20 representative railway bonds..	72.56	73.02	67.16

* * * *



The First Train to Pass Through the Pennsylvania's New Tunnel at Baltimore, Md., upon Its Completion on September 27

The party included officers of the Pennsylvania and of the Arundel Corporation, builder of the tunnel. The occasion was also marked by a dinner at the Hotel Belvedere in Baltimore at which guests included Governor Ritchie of Maryland and Mayor Jackson of Baltimore. The P. R. R. delegation was headed by Vice-President J. F. Deasy who is at the extreme right in the corner of the gondola car.

Railway Officers

EXECUTIVE

H. C. Grout, general superintendent for the Canadian Pacific, with headquarters at Toronto, has been appointed assistant to the vice-president, with headquarters at Montreal, succeeding **W. A. Mather.**

H. C. Weller, whose appointment as resident vice-president for the Norfolk & Western at Bluefield, W. Va., was noted in the *Railway Age* of September 29, entered the service of the Norfolk & Western 48 years as an operator on the Scioto division. In September, 1895, he was appointed dispatcher and became assistant

H. C. Weller

trainmaster in August, 1905. Two years later he was appointed terminal trainmaster with headquarters at Bluefield. Later he served successively as trainmaster of the Pocahontas division, superintendent of the same division, and superintendent of the Scioto division. In February, 1923, he was appointed general superintendent of the Western General division which position he held until his recent appointment.

FINANCIAL, LEGAL AND ACCOUNTING

Charles T. Abeles and **F. S. Sargeant,** solicitors for the Seaboard Air Line, have been appointed assistant general solicitors. The position of solicitor has been abolished.

P. C. White, agent in the real estate department of the Pennsylvania at Chicago, has been promoted to real estate agent with the same headquarters, succeeding **C. W. Myers,** who has been transferred to New York.

OPERATING

Charles G. Grove, superintendent of the Wilkes-Barre division of the Pennsylvania, with headquarters at Sunbury, Pa., has been appointed superintendent of passenger transportation of the Eastern region, with headquarters at Philadelphia, suc-

Continued on next left-hand page

"CROSS CROSSINGS CAUTIOUSLY-"

—is impressed upon highway crossing users by the "Union" Style HC-8 Flashing Light Highway Crossing Signal. Its warning is unmistakable. It minimizes crossing accidents and resulting claims. It is a signal that proves itself economical. It meets all A. R. A. standards. » » » » »

Details of this modern signal are available at our nearest district office. » » »

1881 **Union Switch & Signal Co.** 1934

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

ceeding **J. M. Symes,** promoted. **Samuel R. Hursh,** division engineer of the Pittsburgh division at Pittsburgh, has been appointed superintendent of the Wilkes-Barre division, with headquarters at Sunbury, succeeding Mr. Grove.

W. E. McMullin has been appointed trainmaster of the St. Lawrence division of the New York Central and **L. B. Terbrack** has been appointed trainmaster of the Pennsylvania division.

N. M. McMillan, assistant to the vice-president and general manager of the Eastern lines of the Canadian Pacific has been promoted to general superintendent with headquarters at Toronto, succeeding **H. C. Grout.**

W. H. Cheny, assistant superintendent for the Southern, with headquarters at Spartanburg, S. C., has been appointed superintendent of the Georgia, Southern & Florida, with headquarters at Macon, Ga., succeeding **G. W. Adams.** Mr. Adams has been appointed superintendent of the St. Louis and Louisville divisions of the Southern, with headquarters at Louisville, Ky., succeeding **J. F. Sheridan,** who has been appointed assistant superintendent, with headquarters at Louisville, Ky.

C. H. Tabor, terminal trainmaster for the Norfolk & Western, with headquarters at Bluefield, W. Va., has been appointed trainmaster of the Pocahontas division, succeeding **James O'Keeffe,** promoted. **E. H. Fields,** assistant trainmaster at Eckman, W. Va., has been promoted to succeed Mr. Tabor at Bluefield. **A. H. Tabor** assistant trainmaster at Iaeger, W. Va., has been transferred to Eckman, replacing Mr. Fields. **J. H. Kinzel,** yardmaster at Iaeger, has been appointed assistant trainmaster with the same headquarters, succeeding A. H. Tabor.

W. A. Mather, who has been appointed general manager of the Western Lines of the Canadian Pacific, with headquarters at Winnipeg, Man., as noted in the *Railway Age* of September 15, has been connected with this company continuously for 31 years. He was born on September 12,

W. A. Mather

1885, at Oshawa, Ont., and was educated at McGill University, graduating in 1908. He entered railway service in May, 1903, in the construction department of the Canadian Pacific, being appointed resident engineer at Winnipeg in January, 1911. In March of the following year Mr. Mather was transferred to the operating department as superintendent at Kenora, Ont., being transferred to Medicine Hat, Alta., in January, 1915. In June of the same year he was advanced to assistant general superintendent of the British Columbia district, and in October, 1918, he was further promoted to superintendent of the Saskatchewan district. Later he was transferred to the Alberta district and in 1933 he was appointed assistant to the vice-president, with headquarters at Montreal, Que., the position he was holding at the time of his recent promotion to general manager of the Western Lines.

L. C. Ayers, whose appointment as general superintendent of the Eastern General division of the Norfolk & Western, was noted in the *Railway Age* of September 29, was born at Oak Level, Va., on April 8, 1875. He started his railroad career in September, 1890, as a water boy

(c) Kaiden-Keystone

L. C. Ayers

on the Roanoke & Southern at Roanoke, one of the predecessor lines of the Norfolk & Western. From 1892 to February, 1895, he served successively on the Radford division as timekeeper, track watchman, section laborer, freight brakeman and work train flagman. From February, 1895, to 1901, he worked on the Scioto division then known as the Kenova division) as section foreman, extra gang foreman and work train foreman. In 1901, he was promoted to roadmaster on the Cincinnati and Kenova districts. Mr. Ayers was promoted in 1906 to general supervisor of maintenance and structures on the Scioto division. He was appointed superintendent of construction on the same division in 1909. During the period 1912 to 1923 he held the positions of superintendent of construction on the Scioto division and assistant division superintendent on the Scioto, Pocahontas and Norfolk divisions. In February 1923, he was promoted to superintendent on the Shenandoah division with headquarters at Roanoke.

TRAFFIC

T. S. Acheson, formerly general agricultural agent of the Western Lines of the Canadian Pacific, has been reappointed to that position, with headquarters at Winnipeg., Man., succeeding **J. M. McKay,** who has retired.

O. C. Wallace, who has been connected with the general freight office of the Chicago, Burlington & Quincy at Omaha, Neb., has been promoted to general agent at Scottsbluff, Neb., succeeding **D. Kastrup,** commercial agent, who has been appointed division freight and passenger agent at Hastings, Neb.

R. H. Eberly, general freight agent for the Seaboard Air Line, with headquarters at Norfolk, Va., has been appointed assistant freight traffic manager of rates and divisions, with the same headquarters. **R. T. Etheridge,** assistant general freight agent for this road, with headquarters at Norfolk, Va., has been appointed assistant freight traffic manager in charge of commission cases, with the same headquarters, succeeding **J. H. Ketner,** deceased. **W. A. Marshall,** assistant general freight agent at Norfolk, Va., has been appointed general freight agent, with the same headquarters, succeeding Mr. Eberly. The positions of assistant general freight agent heretofore held by Mr. Etheridge and Mr. Marshall have been abolished.

ENGINEERING AND SIGNALING

E. E. Mayo, assistant engineer on the Southern Pacific, Pacific Lines, has been promoted to the newly-created position of assistant chief engineer, with headquarters as before at San Francisco, Cal. **Paul T. Robinson,** division engineer of the Tucson division, with headquarters at Tucson, Ariz., has been promoted to engineer maintenance of way and structures, with headquarters at San Francisco, succeeding **William M. Jaekle,** deceased. **J. B. Dawson,** assistant division engineer of the Rio Grande division, at El Paso, Tex., has been promoted to division engineer at Tucson to succeed Mr. Robinson, and **W. W. Winn** has been appointed assistant division engineer at El Paso, replacing Mr. Dawson.

SPECIAL

Dr. J. Norman White has been appointed chief surgeon of the Delaware, Lackawanna & Western, succeeding the late **Dr. Jonathan Mayhew Wainwright.**

OBITUARY

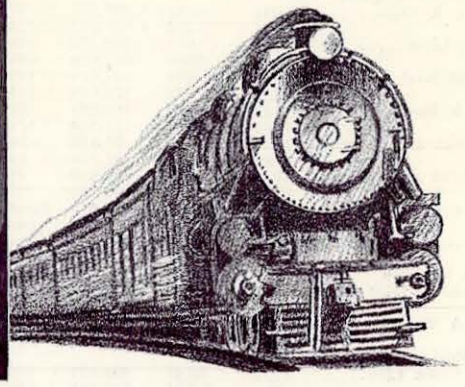
T. A. Matthews, assistant general freight agent on the Chicago, Rock Island & Pacific, with headquarters at Minneapolis, Minn., died at St. Luke's hospital, St. Paul, on September 23.

Joseph M. Simon, assistant general freight agent of the Mobile & Ohio, with headquarters at St. Louis, Mo., died of a heart attack on October 1 at St. Louis. He was 59 years of age.

Thomas F. Gardner, superintendent of transportation of the Missouri-Kansas-Texas, with headquarters at Denison Tex., died on September 30 of a heart attack at his home at Denison.

Table of Operating Statistics of Railways begins on next left-hand page

Railway Profits — *and* PIPE



Railroad executives are well aware that durability of locomotive and car equipment affects the annual showing of railroad management. Whatever deteriorates or gives trouble must be repaired or replaced; and not only such replacements but all resulting interruptions to service must be paid for, along with other elements of cost, before profits begin. This is why many leading railroads have adopted NATIONAL Scale Free Pipe as a practical means of minimizing costs.

For air brake service NATIONAL Scale Free Pipe is unexcelled because—

First: Its clean, smooth surfaces permit the air to act more quickly, with less drop of pressure.

Second: There is no loose scale to clog valves or small openings.

Third: When troubles due to temperature conditions are encountered, as the freezing of condensate in bends and other portions of air brake piping, the exceptional ductility, high tensile strength, and sound welds of this pipe minimize the possibility of failure.

To secure greater economy in piping requirements of your road, be sure the specifications read NATIONAL—*The Original Scale Free Pipe.*

All National Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth glistening surface or metallic lustre which is characteristic of good galvanizing.

NATIONAL TUBE COMPANY · PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

NATIONAL SCALE FREE PIPE
SPELLERIZED

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of July,

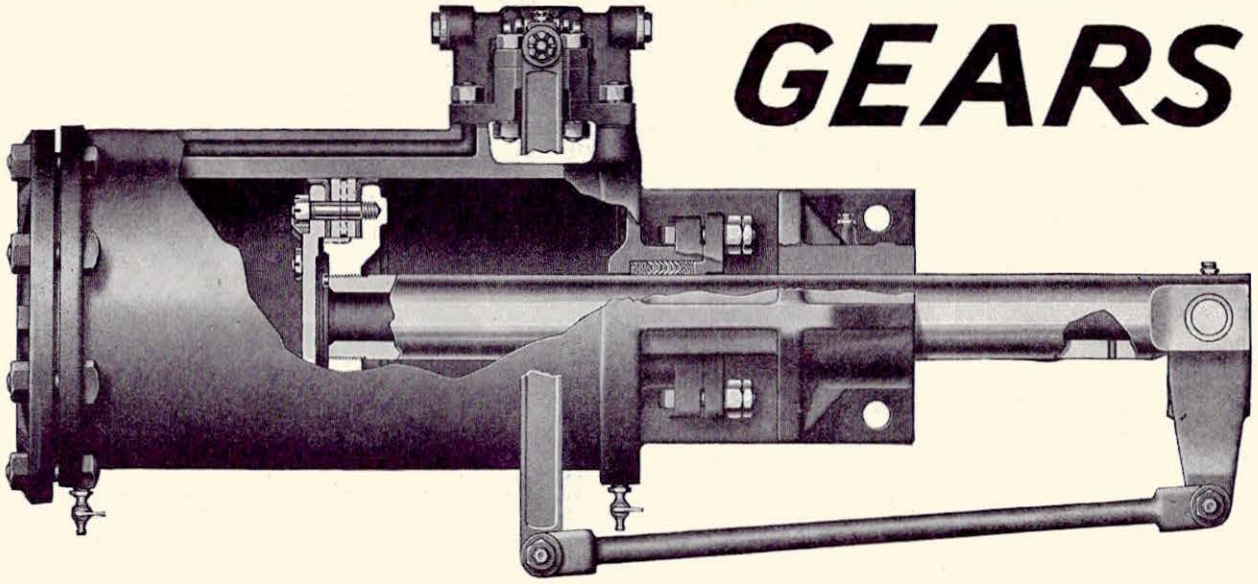
Region, road, and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross Excluding locomotives and tenders	Ton-miles (thousands): Net Revenue and non-revenue	Average number of locomotives on line: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1934	402	115,651	119,717	7,960	2,847	66.4	150,163	49,379	62	38	37.9	16
	1933	402	124,885	130,340	9,449	3,510	67.5	180,501	59,982	56	49	46.7	9
Boston & Maine	1934	2,016	245,702	273,097	26,041	8,044	68.0	435,735	158,889	121	152	55.7	17
	1933	2,059	256,033	286,823	27,110	9,038	67.1	473,423	172,942	126	162	56.3	11
N. Y., New H. & Hartf.	1934	2,049	333,377	406,155	19,204	10,254	64.1	561,360	199,532	202	149	42.5	16
	1933	2,044	357,019	433,942	23,324	11,710	64.3	629,498	220,517	217	142	39.5	38
Great Lakes Region:												
Delaware & Hudson	1934	848	189,675	244,459	24,240	5,817	60.3	361,241	156,782	243	31	11.2	154
	1933	848	204,920	275,053	32,138	6,972	62.7	426,866	189,764	252	27	9.7	153
Del., Lack. & Western	1934	992	334,374	366,787	42,659	9,841	63.9	570,543	208,230	178	78	30.5	51
	1933	998	331,697	368,363	49,136	11,101	66.2	628,178	244,159	205	69	25.1	67
Erie (incl. Chi. & Erie)	1934	2,315	643,275	669,758	50,932	26,264	60.8	1,642,590	574,130	315	176	35.8	80
	1933	2,316	706,700	736,144	61,381	29,421	61.9	1,820,169	662,178	292	214	42.2	54
Grand Trunk Western	1934	1,007	206,500	208,331	2,670	5,329	59.5	325,628	106,886	69	77	52.7	—
	1933	1,008	198,434	200,446	1,575	5,315	59.1	325,121	108,275	75	79	51.3	7
Lehigh Valley	1934	1,335	369,046	386,350	35,603	10,612	62.8	653,527	248,497	181	131	41.9	21
	1933	1,341	374,260	393,338	36,394	11,580	62.9	703,971	273,624	172	152	46.9	14
Michigan Central	1934	1,967	360,710	361,466	12,414	11,182	60.0	665,759	211,647	142	41	22.5	38
	1933	1,957	381,204	381,884	12,605	12,273	59.9	724,634	235,498	129	55	29.9	30
New York Central	1934	6,416	1,355,074	1,439,138	97,862	47,297	59.6	3,044,038	1,246,826	577	492	46.0	74
	1933	6,428	1,425,050	1,522,117	108,877	54,718	60.5	3,458,771	1,437,239	540	632	53.9	36
New York, Chi. & St. L.	1934	1,661	456,150	461,370	4,189	14,010	60.0	854,197	298,323	127	42	24.9	25
	1933	1,660	513,365	545,757	6,159	15,182	60.6	920,294	329,904	122	76	38.3	6
Pere Marquette	1934	2,196	307,010	314,039	2,682	7,088	58.5	448,848	162,347	108	39	26.5	13
	1933	2,254	323,966	335,628	3,628	7,578	59.8	483,372	185,809	122	55	31.0	17
Pitts. & Lake Erie	1934	234	61,865	63,106	16	2,450	59.5	206,339	115,690	30	42	58.4	8
	1933	231	77,830	80,095	1,694	3,125	59.0	268,848	152,910	29	41	59.1	2
Wabash	1934	2,445	519,489	526,781	10,813	14,989	60.4	880,007	288,162	159	177	52.6	46
	1933	2,453	526,536	534,715	11,404	16,594	62.4	968,204	314,243	172	173	50.1	25
Central Eastern Region:												
Baltimore & Ohio	1934	6,263	1,298,739	1,547,545	165,421	36,886	59.4	2,543,070	1,107,937	781	542	41.0	160
	1933	6,282	1,399,933	1,728,599	203,322	43,649	59.5	3,044,598	1,375,954	694	606	46.6	105
Big Four Lines	1934	2,655	528,590	540,501	19,413	14,542	60.4	917,310	386,517	180	144	44.4	44
	1933	2,660	613,636	636,516	24,825	18,544	61.2	1,191,865	529,683	235	179	43.2	28
Central of New Jersey	1934	690	127,615	143,531	24,831	4,088	57.0	287,183	131,723	78	94	54.4	24
	1933	692	128,048	145,113	24,767	4,249	58.6	284,125	126,748	108	67	38.5	51
Chicago & Eastern Ill.	1934	939	162,994	162,994	2,612	3,371	62.6	210,304	84,604	53	56	51.5	10
	1933	939	177,324	178,426	2,663	3,696	61.9	235,822	97,618	57	113	66.6	18
Elgin, Joliet & Eastern	1934	446	73,432	74,798	492	1,497	56.9	117,209	54,772	62	27	30.6	12
	1933	446	82,394	83,200	1,372	2,056	59.6	162,660	80,958	68	20	22.5	19
Long Island	1934	396	24,638	25,576	12,751	245	53.5	18,278	7,141	29	26	47.5	—
	1933	396	26,750	27,537	12,329	285	50.9	21,352	8,156	30	21	41.2	2
Pennsylvania System	1934	10,018	2,571,039	2,846,298	307,330	86,522	60.8	5,870,059	2,526,670	1,475	933	38.7	326
	1933	10,082	2,720,028	3,048,933	326,113	97,509	61.9	6,491,300	2,848,321	1,470	981	40.0	317
Reading	1934	1,454	354,282	384,252	41,445	9,583	58.0	687,179	313,681	269	103	27.7	95
	1933	1,454	385,628	420,658	44,816	11,311	59.3	825,465	389,128	276	103	27.2	94
Pocahontas Region:												
Chesapeake & Ohio	1934	3,105	796,595	834,242	30,672	32,967	54.3	2,836,940	1,503,407	436	106	19.6	115
	1933	3,144	858,538	907,185	39,861	38,766	54.2	3,346,430	1,799,468	518	171	24.8	207
Norfolk & Western	1934	2,162	568,312	590,341	23,425	21,721	58.5	1,759,466	879,241	387	41	9.6	149
	1933	2,217	627,130	654,597	29,443	25,084	58.0	2,119,270	1,109,793	417	62	13.0	178
Southern Region:												
Atlantic Coast Line	1934	5,145	493,831	495,818	6,184	8,492	60.3	465,255	155,749	316	127	28.7	84
	1933	5,144	489,167	490,115	6,845	9,714	62.9	512,185	173,728	365	129	26.1	123
Central of Georgia	1934	1,886	234,444	235,774	4,174	4,768	64.8	264,501	92,299	102	38	27.1	—
	1933	1,886	235,076	237,169	4,185	5,446	69.3	285,704	102,936	100	42	29.6	—
Illinois Central (Incl. Y. & M. V.)	1934	6,617	1,346,195	1,360,271	25,551	29,441	58.3	1,925,044	732,419	570	333	36.9	30
	1933	6,643	1,300,679	1,319,317	22,992	30,611	60.0	1,985,497	782,278	595	346	36.7	16
Louisville & Nashville	1934	5,060	891,641	956,760	18,769	18,601	57.3	1,279,256	569,907	317	298	48.5	21
	1933	5,121	955,612	1,036,781	28,371	22,448	59.4	1,565,545	746,037	318	376	54.1	20
Seaboard Air Line	1934	4,296	439,397	446,581	3,329	9,146	61.8	533,659	189,115	192	88	31.4	22
	1933	4,361	443,700	464,086	3,831	10,179	64.2	572,097	205,111	229	64	21.8	37
Southern	1934	6,599	1,084,628	1,098,582	17,639	23,176	64.4	1,259,777	444,065	619	287	31.7	109
	1933	6,602	1,210,711	1,226,504	20,150	28,918	64.5	1,583,143	569,835	711	207	22.5	204
Northwestern Region:												
Chi., & North Western	1934	8,443	933,600	998,535	23,325	24,871	61.2	1,499,608	522,327	584	228	28.0	164
	1933	8,443	973,813	1,031,031	24,602	24,986	61.5	1,538,592	524,782	576	237	29.1	153
Chicago Great Western	1934	1,463	225,192	225,607	13,785	6,688	59.0	410,912	136,944	60	37	38.2	2
	1933	1,463	214,576	215,820	15,139	6,833	58.5	441,979	159,223	63	35	36.2	4
Chi., Milw., St. P. & Pac.	1934	11,154	1,249,974	1,329,868	63,378	33,126	59.6	2,045,953	762,364	536	352	39.6	160
	1933	11,199	1,216,354	1,294,446	66,289	32,738	58.5	2,125,550	830,843	659	234	26.2	253
Chi., St. P., Minneap. & Om.	1934	1,653	212,517	223,835	10,423	4,394	63.6	263,812	105,747	119	37	23.9	54
	1933	1,681	225,337	237,431	9,383	4,865	67.2	298,626	116,582	131	25	16.2	61
Great Northern	1934	8,302	758,744	763,905	20,879	23,423	60.5	1,510,452	637,906	427	164	27.7	91
	1933	8,424	598,070	603,432	16,812	19,074	61.0	1,277,625	563,165	466	145	23.8	150
Minneap., St. P. & S. St. M.	1934	4,280	349,714	356,564	3,211	7,691	60.1	441,371	163,618	119	38	24.5	2
	1933	4,291	321,444	324,710	3,269	7,297	65.0	418,371	174,687	127	45	26.3	10
Northern Pacific	1934	6,414	689,226	749,309	45,485	19,444	62.7	1,178,203	443,219	361	155	30.1	24
	1933	6,413	634,807	693,710	49,182	18,509	62.0	1,155,813	428,032	370	155	29.5	49
Oreg.-Wash. R. R. & Nav.	1934	2,148	151,810	158,036	9,972	3,550	68.7	197,374	74,517	83	40	32.8	18
	1933	2,165	153,360	159,041	10,376	3,809	64.6	227,765	88,913	83	40	32.3	22
Central Western Region:												
Alton	1934	921	204,119	216,567	1,749	4,289	58.6	281,851	95,775	52	44	45.8	—
	1933	952	192,232	199,482	1,502	4,202	56.1	282,695	94,708	57	42	42.0	1
Atch., Top. & S. Fe (incl. P. & S. F.)	1934	11,407	1,510,338	1,588,276	66,886	42,548	59.6	2,697,711	843,342	579	320	35.6	120
	1933	11,586	1,318,505	1,423,887	61,711	36,881	63.2	2,268,534	761,835	642	286	30.8	206
Chi., Burl. & Quincy	1934	9,096	1,171,944	1,220,499	38,780	29,503	59.5	1,757,820	693,270	451	116	20.5	7
	1933	9,157	1,072,665	1,104,896	29,521	27,920	60.4	1,705,050	714,005	424	131	23.6	31
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1934	8,316	1,052,860	1,070,319	8,961	23,415	61.4	1,421,679	526,197	442	146	24.9	98
	1933	8,333	1,046,421	1,064,877	5,435	23,811	59.7	1,475,772	542,428	455	157	25.7	91
Denver & R. G. Wn.	1934	2,636	230,047	249,309	26,279	6,025	62.5	368,156	133,394	162	51	23.9	19
	1933	2,514	176,449	192,624	17,693	5,522	67.7	320,414	126,328	201	41	17.0	62
Los Angeles & Salt Lake	1934	1,232	166,087	193,429	30,397	4,691	63.4	292,610	113,985	71	23	24.2	6
	1933	1,239	136,433	152,292	18,911	3,857	67.4	227,099	87,187	75	31	29.7	13
Oregon Short Line	1934	2,468	234,231	246,088	15,844	5,933	63.9	348,199	124,882	126	54	30.1	37
	1933	2,477	217,974	231,222	18,184	5,696	63.6	333,901	123,693	118	67	36.2	36
Southern Pacific—Pacific Lines	1934	8,607	1,310,684	1,421,661	159,077	41,047	59.1	2,647,132	854,702	561	289	33.9	112
	1933	8,879	1,069,096	1,139,708	118,985	33,934	60.5	2,116,799	647,223	518	385	42.6	155
Union Pacific	1934	3,768	918,693	942,523	42,555	29,566	55.1	1,922,409	575,090	302	125	29.2	70
	1933	3,768	789,472	810,270	38,154	27,672	60.4	1,763,548	569,357	351	111	24.1	161
Southwestern Region:												
Gulf, Colo. & S. Fe	1934	1,906	180,825	185,163	2,818	4,853	61.7	315,671	128,575	85	34	28.5	20
	1933	1,943	176,720	179,915	3,202	4,445	61.4	290,860	119,007	91	34	27.3	25
Mo.-Kans.-Texas Lines	1934	3,282	362,748	365,066	4,185	9,468	60.8	570,111	195,232	141	74	34.5	57
	1933	3,282	347,626	349,851	4,425	8,712	60.6	517,346	184,110	167	65	28.1	85
Missouri Pacific	1934	7,330	1,112,345	1,145,735	25,952	29,341	58.8	1,845,509	664,977	422	135	24.3	147
	1933	7,384	1,026,342	1,055,888	23,324	28,534	62.7	1,758,900	686,583	406	160	28.3	136
St. Louis-San Francisco	1934	5,060	644,436	649,721	7,903	13,863	59.6	856,719	321,408	394	83	17.4	143
	1933	5,193	603,218	609,541	7,164	13,090	59.3	823,376	314,912	390	82	17.4	141
St. Louis Southwestern Lines	1934	1,798	209,494	213,787	2,843	5,006	62.5	290,024	98,259	90	36	28.6	7
	1933	1,872	224,509	231,090	3,150	5,465	62.1	285,073	109,157	99	33	25.1	18
Texas & New Orleans	1934	4,433	478,489	478,585	3,928	10,555	59.5	655,485	228,395	234	68	22.5	62
	1933	4,472	463,547	463,910	5,787	9,935	58.0	623,678	203,294	219	93	29.8	54
Texas & Pacific	1934	1,946	254,012	254,012	2,599	7,773	63.6	463,823	152,640	156	78	33.3	88
	1933	1,946	247,538	247,557	1,193	7,501	60.3	468,833	155,876	177	61	25.5	78

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

1934, Compared with July, 1933, for Roads with Annual Operating Revenues Above $25,000,000

Region, road, and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive day
New England Region:													
Boston & Albany	1934 3,030	3,382	6,412	25.2	21,712	1,298	427	17.3	248	21.6	3,965	153	41.0
	1933 4,373	3,441	7,814	34.4	23,841	1,445	480	17.1	248	21.5	4,816	147	42.8
Boston & Maine	1934 9,773	6,033	15,806	14.1	24,714	1,773	647	19.8	324	24.2	2,543	102	35.3
	1933 9,024	8,070	17,094	16.7	25,260	1,847	674	19.1	326	25.4	2,705	98	35.2
N. Y., New H. & Hartf.	1934 15,827	9,584	25,411	12.3	25,746	1,684	599	19.5	253	20.3	3,141	101	39.1
	1933 15,235	10,574	25,805	11.2	26,897	1,763	618	18.8	276	22.8	3,480	103	41.1
Great Lakes Region:													
Delaware & Hudson	1934 11,871	2,416	14,287	4.1	26,420	1,905	827	27.0	354	21.8	5,962	109	31.7
	1933 11,901	2,983	14,884	4.1	26,518	2,083	926	27.2	411	24.1	7,218	108	35.5
Del., Lack. & Western	1934 16,732	4,179	20,911	11.8	26,675	1,706	623	21.2	321	23.8	6,772	134	51.5
	1933 17,517	4,211	21,728	11.7	27,744	1,894	736	22.0	362	24.9	7,891	127	49.2
Erie (incl. Chi. & Erie)	1934 26,368	12,253	38,621	6.7	42,432	2,553	893	21.9	480	36.1	7,999	91	47.3
	1933 33,054	13,331	46,385	6.6	41,514	2,576	937	22.5	461	33.1	9,223	91	50.8
Grand Trunk Western	1934 5,102	6,628	11,730	14.0	30,184	1,577	518	20.1	294	24.6	3,425	92	46.7
	1933 5,308	8,066	13,374	20.3	29,640	1,638	546	20.4	261	21.7	3,464	90	42.5
Lehigh Valley	1934 18,400	5,410	23,810	18.2	31,698	1,771	673	23.4	337	22.9	6,006	128	43.7
	1933 18,541	5,458	23,999	21.5	32,210	1,881	731	23.6	368	24.7	6,583	127	42.8
Michigan Central	1934 19,700	19,421	39,121	7.8	34,100	1,846	587	18.9	175	15.4	3,471	100	66.0
	1933 25,650	18,492	44,142	11.3	34,703	1,901	618	19.2	172	15.0	3,881	103	69.3
New York Central	1934 57,421	57,775	115,196	24.0	36,601	2,246	920	26.4	349	22.2	6,269	93	46.4
	1933 72,948	63,166	136,114	26.6	37,897	2,427	1,009	26.3	341	21.4	7,213	90	44.9
New York, Chi. & St. L.	1934 8,899	6,327	15,226	5.1	33,506	1,873	654	21.3	632	49.4	5,795	89	88.7
	1933 9,511	7,442	16,953	6.9	32,198	1,793	643	21.7	628	47.6	6,410	92	90.1
Pere Marquette	1934 11,252	4,545	15,797	3.3	24,775	1,462	529	22.9	332	24.8	2,385	88	69.5
	1933 12,132	4,435	16,567	2.9	25,774	1,492	574	24.5	362	24.7	2,659	83	61.8
Pitts. & Lake Erie	1934 16,279	10,590	26,869	43.2	49,852	3,335	1,870	47.2	139	4.9	15,970	87	28.4
	1933 16,791	9,562	26,353	28.2	48,766	3,454	1,965	48.9	187	6.5	21,336	87	37.6
Wabash	1934 14,227	8,390	22,617	3.7	33,836	1,694	555	19.2	411	35.4	3,802	105	51.6
	1933 15,502	9,204	24,706	5.3	36,358	1,839	597	18.9	410	34.7	4,132	95	51.0
Central Eastern Region:													
Baltimore & Ohio	1934 82,199	20,588	102,787	17.7	26,420	1,958	853	30.0	348	19.5	5,707	135	41.8
	1933 90,296	24,732	115,028	20.1	27,316	2,175	983	31.5	386	20.6	7,065	136	47.9
Big Four Lines	1934 15,794	22,524	38,318	13.5	30,804	1,735	731	26.6	325	20.3	4,697	108	55.7
	1933 19,594	22,369	41,963	17.5	32,975	1,942	863	28.6	407	23.3	6,423	103	51.5
Central of New Jersey	1934 16,586	6,841	23,427	33.9	27,710	2,250	1,032	32.2	181	9.9	6,159	128	31.6
	1933 16,469	6,078	22,547	29.7	26,315	2,219	990	29.8	181	10.4	5,909	129	31.4
Chicago & Eastern Ill.	1934 4,734	2,412	7,146	19.3	23,243	1,290	519	25.1	382	24.3	2,907	119	49.0
	1933 6,050	2,743	8,793	19.8	23,388	1,330	551	26.4	358	21.9	3,354	115	34.5
Elgin, Joliet & Eastern	1934 9,091	3,693	12,784	17.6	16,074	1,596	746	36.6	138	6.6	3,961	117	27.3
	1933 9,370	3,770	13,140	19.5	17,485	1,974	983	39.4	199	8.5	5,855	108	31.0
Long Island	1934 783	2,683	3,466	2.1	6,099	742	290	29.1	66	4.3	581	302	22.5
	1933 767	3,548	4,315	1.7	5,828	798	305	28.6	61	4.2	664	275	25.0
Pennsylvania System	1934 244,871	47,993	292,864	12.8	32,940	2,283	983	29.2	278	15.7	8,136	114	42.2
	1933 245,182	58,811	303,993	11.9	32,952	2,386	1,047	29.2	302	16.7	9,114	111	44.4
Reading	1934 35,811	7,138	42,949	10.6	24,769	1,939	885	32.7	236	12.4	6,961	143	36.9
	1933 36,581	8,496	45,077	24.9	26,501	2,141	1,009	34.4	278	13.6	8,634	134	39.6
Pocahontas Region:													
Chesapeake & Ohio	1934 41,794	11,934	53,728	1.9	50,678	3,561	1,887	45.6	903	36.5	15,620	69	51.5
	1933 45,324	10,788	56,112	2.1	53,841	3,898	2,096	46.4	1,034	41.1	18,463	67	44.4
Norfolk & Western	1934 36,516	4,143	40,659	3.0	46,914	3,096	1,547	40.5	698	29.5	13,116	97	46.3
	1933 35,517	4,827	40,344	4.0	51,127	3,379	1,770	44.2	887	34.5	16,145	95	46.0
Southern Region:													
Atlantic Coast Line	1934 24,989	3,865	28,854	24.9	17,562	942	315	18.3	174	15.7	976	125	36.5
	1933 25,543	3,732	29,275	27.2	19,254	1,047	355	17.9	191	17.0	1,089	115	32.5
Central of Georgia	1934 6,617	3,222	9,839	23.4	19,761	1,128	394	19.4	303	24.1	1,579	122	55.3
	1933 6,815	3,681	10,496	21.4	20,795	1,215	438	18.9	316	24.2	1,761	123	54.8
Illinois Central (Incl. Y. & M. V.)	1934 54,105	15,455	69,560	39.8	24,745	1,430	544	24.9	340	23.4	3,570	125	49.5
	1933 53,437	14,651	68,088	30.6	25,871	1,527	601	25.6	371	24.2	3,799	125	46.0
Louisville & Nashville	1934 49,307	7,444	56,751	31.6	23,327	1,435	639	30.6	324	18.4	3,633	132	51.2
	1933 50,294	7,473	57,767	28.3	23,602	1,638	781	33.2	417	21.1	4,699	125	49.5
Seaboard Air Line	1934 11,632	3,687	15,319	7.1	20,911	1,215	430	20.7	398	31.1	1,420	117	51.8
	1933 12,275	4,019	16,294	8.0	21,438	1,289	462	20.2	406	31.4	1,517	119	51.5
Southern	1934 31,656	13,116	44,772	20.0	20,258	1,161	409	19.2	320	25.9	2,171	143	39.7
	1933 31,147	18,584	49,731	21.5	21,659	1,308	471	19.7	370	29.1	2,784	138	43.8
Northwestern Region:													
Chi., & North Western	1934 43,530	19,117	62,647	12.2	24,351	1,606	559	21.0	296	20.9	1,996	113	40.6
	1933 43,991	18,841	62,832	11.1	23,968	1,580	539	21.0	269	20.9	2,005	112	41.9
Chicago Great Western	1934 2,281	2,890	5,171	2.4	34,294	1,825	608	20.5	854	70.8	3,020	117	79.4
	1933 3,804	3,240	7,044	7.9	35,577	2,060	742	23.3	729	53.5	3,510	116	75.8
Chi., Milw., St. P. & Pac.	1934 57,057	15,944	73,001	5.1	26,086	1,637	610	23.0	337	24.6	2,205	111	50.6
	1933 57,739	15,020	72,759	4.7	26,863	1,747	683	25.4	368	24.8	2,393	108	49.2
Chi., St. P., Minneap. & Om.	1934 2,074	6,807	8,881	10.2	18,589	1,241	498	24.1	384	25.1	2,064	107	48.5
	1933 2,041	6,696	8,737	11.1	19,501	1,325	517	24.0	430	26.7	2,238	101	51.0
Great Northern	1934 42,183	9,444	51,627	9.3	31,768	1,991	841	27.2	399	24.2	2,478	107	42.9
	1933 42,871	8,850	51,721	7.7	32,846	2,136	942	29.5	351	19.5	2,157	104	32.8
Minneap., St. P. & S. St. M.	1934 16,351	3,222	19,573	4.2	20,382	1,262	468	21.3	270	21.1	1,233	98	73.9
	1933 18,899	3,084	21,983	5.1	20,386	1,302	543	23.9	257	16.5	1,313	97	61.5
Northern Pacific	1934 38,881	4,431	43,312	13.8	28,655	1,709	643	22.8	330	23.1	2,229	147	49.7
	1933 41,328	4,163	45,491	13.0	29,781	1,821	674	23.1	304	21.2	2,153	138	45.6
Oreg.-Wash. R. R. & Nav.	1934 8,164	2,688	10,852	3.5	21,529	1,300	491	21.0	222	15.4	1,119	148	44.2
	1933 7,978	2,887	10,865	6.9	23,716	1,485	580	23.3	264	17.5	1,325	137	44.3
Central Western Region:													
Alton	1934 3,254	6,679	9,933	22.6	28,347	1,381	469	22.3	311	23.7	3,353	112	73.4
	1933 3,214	6,224	9,438	16.7	28,622	1,471	493	22.5	324	25.6	3,211	104	65.5
Atch., Top. & S. Fe (incl. P. & S. F.)	1934 67,195	9,149	76,344	12.6	33,287	1,786	558	19.8	356	30.2	2,385	99	59.4
	1933 67,457	8,317	75,774	13.1	32,294	1,721	578	20.7	324	24.9	2,121	101	51.6
Chi., Burl. & Quincy	1934 34,146	12,837	46,983	9.0	25,863	1,500	592	23.5	476	34.1	2,459	113	71.7
	1933 39,605	13,300	52,905	9.9	26,367	1,590	666	25.6	435	28.2	2,515	108	65.9
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1934 32,549	10,242	42,791	21.3	23,967	1,350	500	22.5	397	28.8	2,041	125	59.2
	1933 34,477	11,153	45,630	21.5	23,742	1,410	518	22.8	383	28.2	2,100	122	56.4
Denver & R. G. Wn.	1934 14,006	3,470	17,476	5.3	25,258	1,600	580	22.1	246	17.8	1,632	164	41.7
	1933 14,141	2,786	16,927	4.1	28,358	1,816	716	22.8	241	15.5	1,621	150	28.1
Los Angeles & Salt Lake	1934 4,628	977	5,605	8.9	30,984	1,762	686	24.3	656	42.6	2,985	134	76.7
	1933 4,215	917	5,132	8.9	29,925	1,665	639	22.6	548	36.0	2,269	137	52.0
Oregon Short Line	1934 8,479	2,565	11,044	21.6	25,474	1,487	533	21.0	365	27.1	1,632	112	46.8
	1933 9,803	2,890	12,693	20.2	27,883	1,532	567	21.7	314	22.8	1,611	110	43.4
Southern Pacific—Pacific Lines	1934 35,292	25,672	60,964	8.9	31,944	2,020	652	20.8	452	36.7	3,203	101	60.0
	1933 38,920	22,230	61,150	13.7	31,887	1,980	605	19.1	341	29.6	2,351	101	44.9
Union Pacific	1934 24,279	8,902	33,181	19.4	49,586	2,093	626	19.5	559	52.2	4,924	103	74.4
	1933 24,581	8,110	32,691	19.5	49,418	2,234	721	20.6	562	45.2	4,875	98	59.2
Southwestern Region:													
Gulf, Colo. & S. Fe	1934 9,145	1,521	10,666	12.6	28,674	1,746	711	26.5	389	23.8	2,176	100	51.0
	1933 11,168	1,417	12,585	8.0	27,839	1,646	673	26.8	305	18.6	1,975	98	47.1
Mo.-Kans.-Texas Lines	1934 7,440	3,762	11,202	2.6	28,885	1,572	538	20.6	562	44.9	1,919	82	55.4
	1933 10,140	2,670	12,810	7.7	26,476	1,488	530	21.1	464	36.2	1,810	83	49.3
Missouri Pacific	1934 22,049	18,946	40,995	4.0	29,769	1,659	598	22.7	523	39.3	2,926	115	67.8
	1933 25,158	18,555	43,713	13.7	29,822	1,714	669	24.1	507	33.6	2,999	115	61.5
St. Louis-San Francisco	1934 22,231	4,588	26,819	7.4	23,538	1,329	499	23.2	387	28.0	2,040	122	44.5
	1933 24,350	4,808	29,158	8.3	23,357	1,365	522	24.1	348	24.4	1,956	126	42.1
St. Louis Southwestern Lines	1934 4,490	2,499	6,989	9.9	25,723	1,384	469	19.6	454	37.0	1,763	94	55.7
	1933 4,635	3,276	7,911	11.8	23,034	1,270	486	20.0	445	35.9	1,881	96	57.4
Texas & New Orleans	1934 8,126	10,119	18,245	8.9	24,276	1,370	477	21.6	404	31.3	1,662	88	51.6
	1933 8,615	10,275	18,890	8.0	23,539	1,345	439	20.5	347	29.2	1,466	87	48.6
Texas & Pacific	1934 3,630	3,903	7,533	7.9	29,215	1,826	601	19.6	654	52.3	2,531	82	35.4
	1933 4,386	4,575	8,961	7.3	30,310	1,894	630	20.8	561	44.8	2,584	82	33.8

POWER REVERSE GEARS



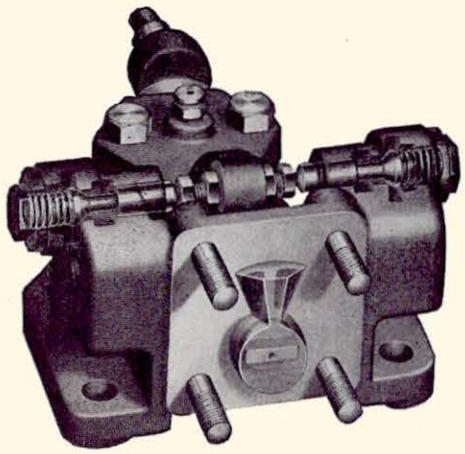
That Insure Low Maintenance—

cost and long trouble-free service. These desirable advantages are offered with BARCO Power Reverse Gears through exclusive features.

OUTBOARD PISTON ROD BEARING AND GUIDE. This guide is cast integral with the cylinder and bolted direct to the reverse gear bracket. It eliminates any weaving action of the piston rod on the piston rod packing and piston packing cups thus greatly increasing their service life. The bearing is always in perfect alignment as it does not have to be disturbed during repacking.

DUAL CONTROL VALVE. The combination of small rotary admission valve keyed to the shaft with poppet valves for exhaust provides exceptionally close adjustment and maintains the point of cut-off selected. Centering of valve after each operation is assured. The entire valve is easily removed from reverse gear for repairs or exchange.

All other parts are built and designed to the latest and best power reverse gear practice, including the hollow trunk piston rod.



Interior BARCO Dual Control Valve

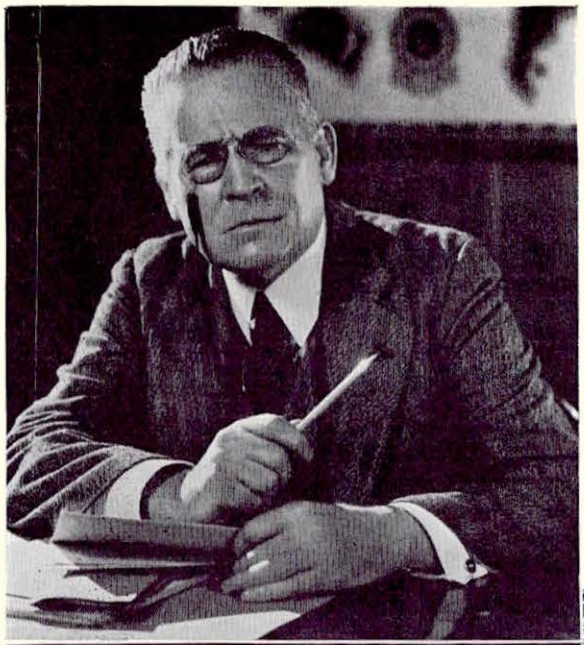
Barco Manufacturing Co.

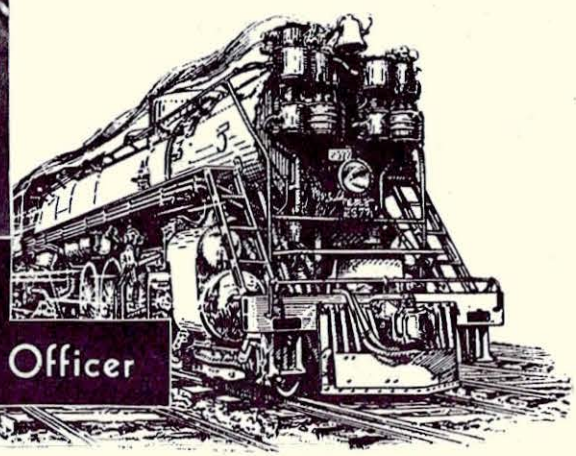
1801 Winnemac Avenue, Chicago, Illinois

In Canada THE HOLDEN CO., LTD. In Canada

Montreal—Moncton—Toronto Winnipeg—Vancouver

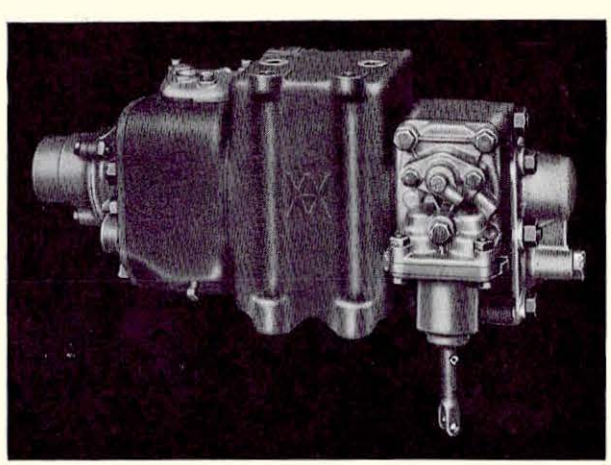
BARCO





"COSTS MUST BE CUT", decrees the Chief Operating Officer

THE Chief Operating Officer scans every item of expense—frowning at increases and smiling upon reductions . . . . When reports indicate that higher train schedules are being maintained without delays; when damages to equipment and lading are "few and far between"; when heavier tonnage trains are handled in safety; when a high percentage of cars are kept available for service at all times; when fuel expense is at a minimum;—he knows that all factors which effect operating costs are functioning efficiently. The "AB" Equipment—our new brake for freight train service—contributes greatly to these results.



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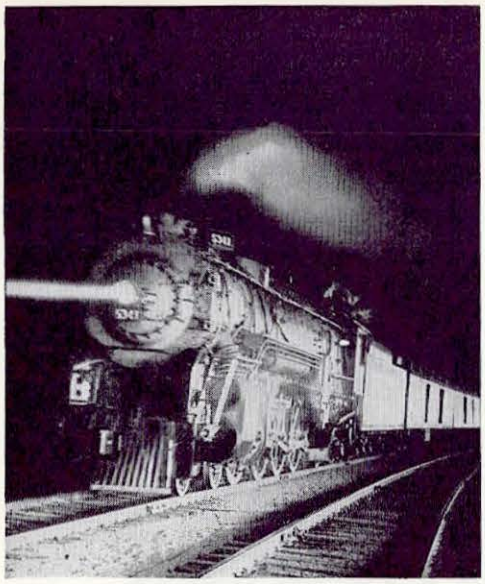
★ WESTINGHOUSE AIR BRAKE COMPANY

General Office and Works - WILMERDING, PA.

MISSOURI PACIFIC



Spray-Paints with DeVILBISS Equipment

The Missouri Pacific Lines use DeVilbiss Spray-Painting Equipment—another example of the preference shown by progressive roads for DeVilbiss products.

Leading railroad operators appreciate the importance of using modern methods. They know that spray-painting has many advantages over old-fashioned methods of application, and that new and modern DeVilbiss products have many advantages over old-style spray-painting equipment.

DeVilbiss Spray-Painting Equipment is especially designed for the most effective and economical painting of cars, locomotives, structures and buildings. It produces higher quality paint jobs, which improve appearance and provide better protection. And, through faster and more efficient operations, it lowers painting costs.

Ask your local DeVilbiss representative about the latest developments in DeVilbiss Spray-Painting and Canopy Exhaust Equipment. See him now, or write us direct.

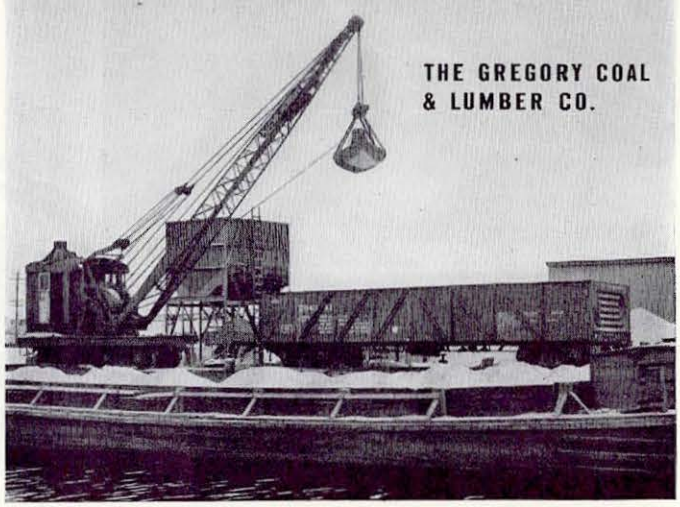
THE DEVILBISS COMPANY · TOLEDO · OHIO

New York Philadelphia Cleveland
Detroit Chicago St. Louis
San Francisco Windsor, Ontario

Direct sales and service representatives available everywhere.

DeVilbiss

"Well Satisfied.. WITH OUR INVESTMENT IN THIS CRANE.."



The Gregory Coal & Lumber Company purchased an Industrial Brownhoist locomotive crane in 1920. Recently, during their annual equipment overhaul they tested and inspected this machine. What did they find? —"No repairs or parts needed," is their comment. Furthermore, they say—

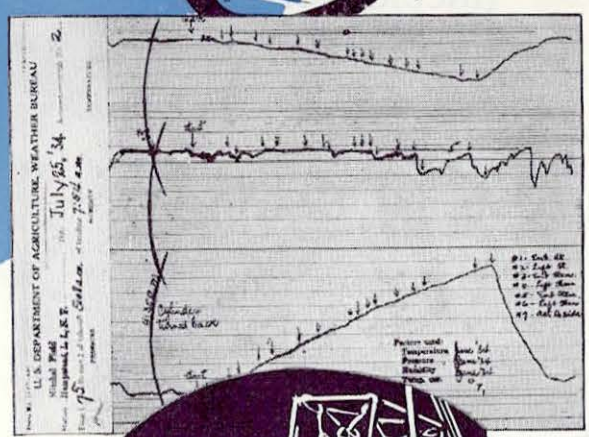
"This piece of equipment has been continuously employed on our bulkhead dock in unloading bulk materials, brick, sand, etc., from water craft, as well as reloading these materials from storage piles to trucks, hoppers, etc.

"Despite the fact that our Industrial Brownhoist has been exposed to salt marsh vapors and the ravages of weather, it is in splendid condition. We feel that this equipment was properly designed and constructed, and that its efficient operation has been due, in a large measure, to your practical suggestions in its operation and maintenance. We are well satisfied with our investment in this crane."

INDUSTRIAL BROWNHOIST CORPORATION
General Offices: Bay City, Michigan
District Offices: New York, Philadelphia, Chicago, Cleveland

INDUSTRIAL BROWNHOIST
THE COMPLETE LINE OF LOCOMOTIVE AND CRAWLER CRANES

Instruments

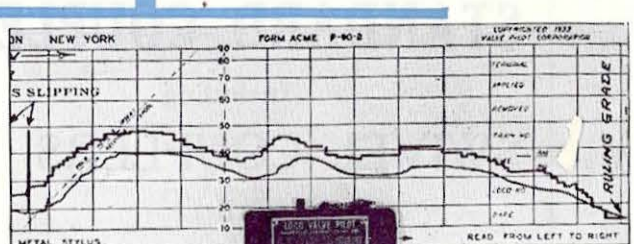


Aerometeogram by courtesy New York Sun

INSTRUMENTS on aeroplanes? Of course! The airman isn't expected to work by intuition. Maybe on the "Kitty Hawk" that was all right—there were no instruments then—but today recording instruments on aircraft are a matter of course and their story is a log of the flight.

On locomotives, instruments are equally necessary for safety and good performance.

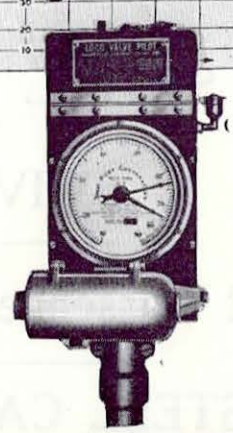
The Loco Valve Pilot



Valve Pilots are showing enginemen on hundreds of locomotives what to do and when to do it and the tape record gives a complete story of the run—speed, cut-off, brake applications, drifting, slipping and other phases.

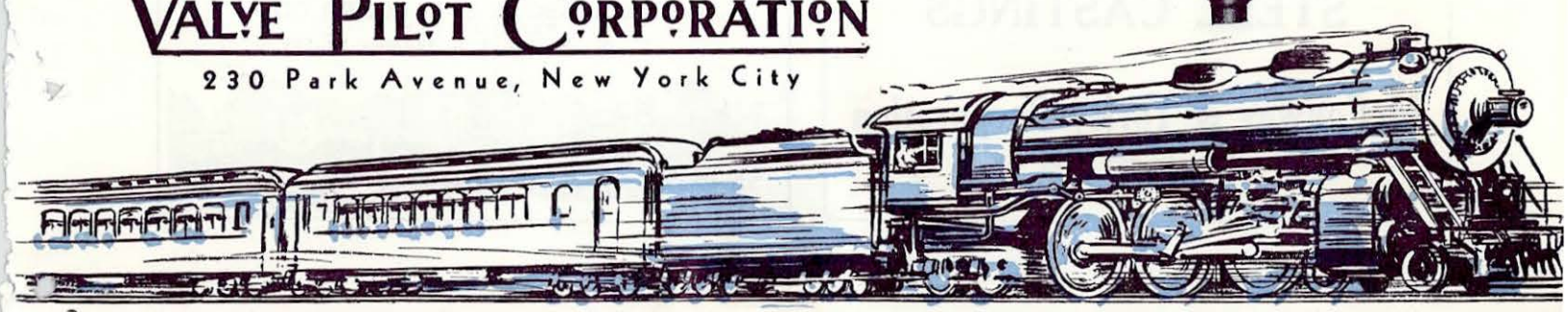
Instrument operation shows the way to higher standards of performance and economy.

Enginemen have greater responsibilities than airmen. They need the Valve Pilot.



Valve Pilot Corporation

230 Park Avenue, New York City



THE CAREFUL INVESTOR JUDGES A SECURITY
BY THE HISTORY OF ITS PERFORMANCE

KERITE

IN THREE-QUARTERS OF A CENTURY OF
CONTINUOUS PRODUCTION HAS ESTABLISHED
A RECORD OF PERFORMANCE
THAT IS UNEQUALLED IN THE HISTORY OF
INSULATED WIRES AND CABLES

THE KERITE INSULATED WIRE & CABLE COMPANY INC
NEW YORK CHICAGO SAN FRANCISCO

MAGNUS COMPANY

(INCORPORATED)

Journal Bearings

AND

Bronze Engine Castings

New York Chicago

A. R. A.
STANDARD COUPLERS

Including

SWIVEL COUPLERS

With

SWIVEL BUTTS

Or

SWIVEL YOKES

Pitt Passenger Couplers

STEEL CASTINGS

McConway & Torley Corporation
Pittsburgh, Pa.

PANTASOTE
AGASOTE and STEELASOTE
In 8th Avenue Subway Cars

The 800 cars recently purchased for the 8th Avenue (New York) Subway have Agasote for the Headlining, Steelasote for Wainscoting and Pantasote for the Motorman's Curtains. Pantasote Products have contributed to lower maintenance costs in every transportation field for more than thirty years.

Samples and prices gladly sent on request

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250 Park Avenue, New York City

683 Atlantic Ave.
BOSTON
Monadnock Bldg.
SAN FRANCISCO

1402 Conti St.
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Peoples Gas Bldg.
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Selling Agents for
THE PANTASOTE LEATHER CO.
PASSAIC, N. J.
and
THE AGASOTE MILLBOARD CO.
TRENTON, N. J.
(In the Railroad & Marine Field)

VAPOR Products

STEAM COUPLERS ARA Standard

VAPOR SYSTEM Thermostatic Control

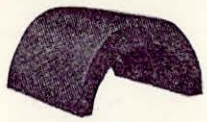
FLEXIBLE CONDUITS in place of Steam Hose

CONTROLS for Air Conditioning

VAPOR CAR HEATING CO., Inc.
RAILWAY EXCHANGE, CHICAGO

"Arctic" BRONZE
CROWN BEARINGS

CHILL CAST



METAL MOULDS (Patented)

WRITE FOR PRINT LISTING SIZES
NATIONAL BEARING METALS CORP.
ST. LOUIS, MO.

New York, N. Y. Jersey City, N. J. Pittsburgh, Pa. Meadville, Pa. Portsmouth, Va. St. Paul, Minn.

GET TOGETHER DEPARTMENT

EDUCATIONAL

THE Railway Educational Bureau, Omaha, Neb., offers a distinctive education service for Supervisors and other employes. Write for FREE Special Bulletin.

WANTED

Cast Steel Truck Side Frames 30, 40, 50 and 70 ton

Journal Boxes, Vulcan and Scullin 40 and 50 ton

Address Box 901, RAILWAY AGE 30 Church St., New York, N. Y.

Your classified advertisement should appear in this section

POSITION OPEN

SALARIED POSITIONS $2,500 to $25,000—This thoroughly organized advertising service of 24 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate, and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.

R. W. BIXBY, Inc.
102 Delward Bldg., Buffalo, N. Y.

FOR SALE

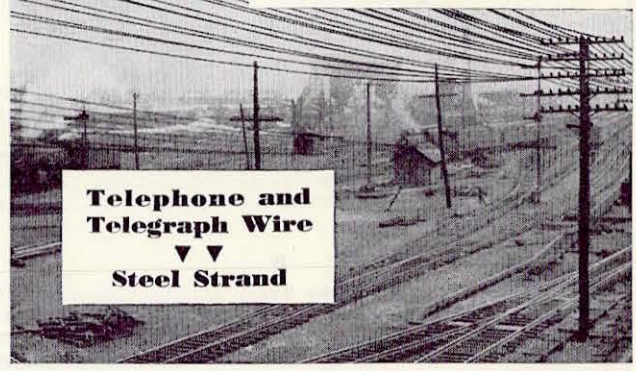
Mr. Car Operator
Recommend Buy Use
SERVICE-TESTED FREIGHT CAR PARTS
and reduce your "Material" costs at least 50%! ! !
Iron & Steel Products, Inc.
Frank Parker, Pres.
Railway Exchange, Chicago

If you are looking for a man or in need of a position, your advertisement should appear in the Get Together Department

Stand Up in the Toughest Spots

Crapo Galvanized Telephone and Telegraph Wire and Steel Strand long ago proved their ability to stand up where corrosive elements take greatest toll. The heavy, uniform, *pure* zinc coating, applied by the *Crapo* Patented Process, insures corrosion-resisting joints, longer life and lower maintenance costs. Specify genuine *Crapo* Galvanized Products for greater dependability in the toughest spots!

Indiana Steel & Wire Co.
Muncie, Indiana



NATIONAL CARBIDE

Y-199 Handy Light

LANTERNS and National Carbide V. G. Flarelights —the highest development in carbide lighting equipment.

Lanterns with blue rear light for car inspection — with red rear light for motor car headlights and signal lights — handy lamps and portable lights for track maintenance —standard on many railroads.

WLI-CI Lantern

NATIONAL CARBIDE SALES CORP.
LINCOLN BLDG., 60 EAST 42nd ST., NEW YORK, N.Y.

This shoe does the work while your engines and cars are in service.

SAVES TIME
SAVES LABOR
SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
Detroit Michigan

Steam *and* Electric Specialties *for* Passenger Car Heating

GOLD CAR HEATING & LIGHTING CO.
NEW YORK

EDGEWATER STEEL COMPANY
PITTSBURGH, PA.

Details of our products appeared in the following issues of *Railway Age* during 1932, 1933, 1934:
1932—Jan. 2—March 5—April 2—May 7—June 18, 25—Sept. 3.
1933—Feb. 4, 25—March 4—April 1—May 6—June 3, 24—July 1, 22—Sept. 2—Oct. 7, 28—Nov. 4—Dec. 2.
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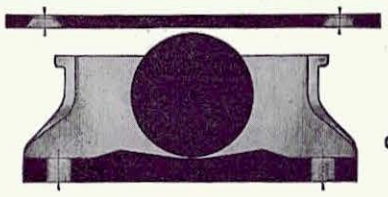

STUCKI SIDE BEARINGS
Manufactured by
A. Stucki Co.
Oliver Bldg., Pittsburgh, Pa.
Canadian Representatives
The Holden Co., Ltd.,
Montreal, Can.

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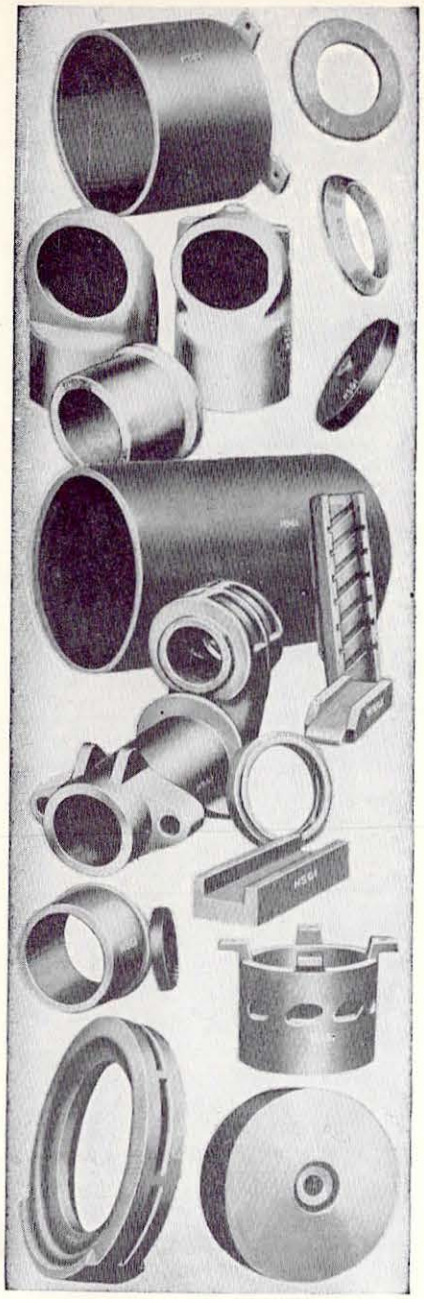

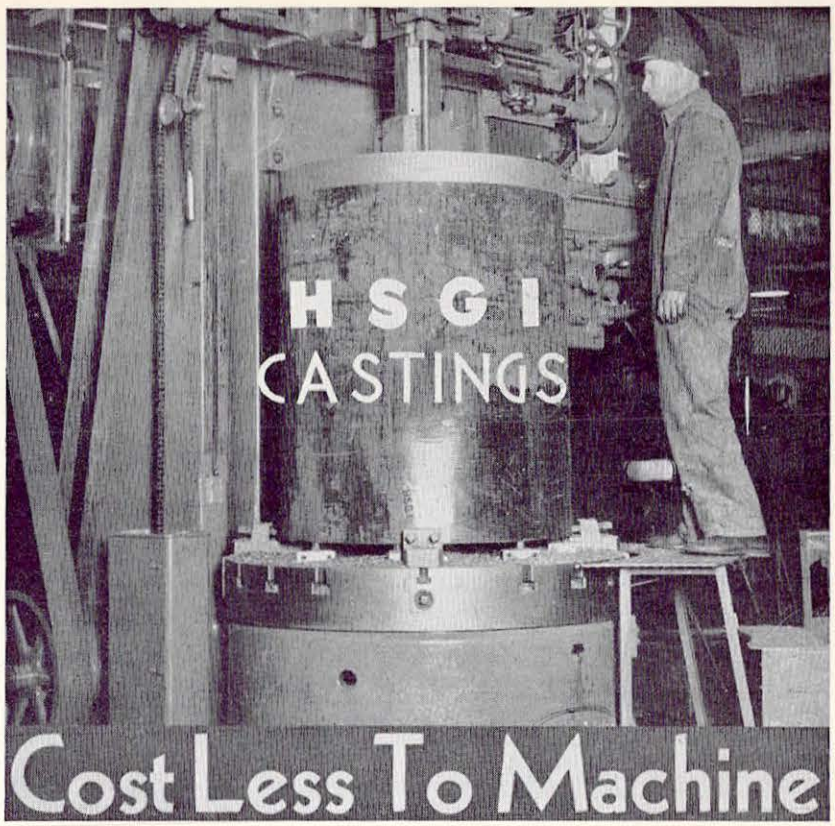

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ECONOMICAL machine operation requires castings true to pattern dimensions. HSGI trade-mark is your guarantee of this specification.

The uniformity of HUNT-SPILLER *Air Furnace* Gun Iron permits manufacture without excessive stock.

Less time is required for machining because less stock has to be removed, less material is wasted, and the wear-resisting qualities of HUNT-SPILLER *Air Furnace* Gun Iron insure maximum mileage and minimum maintenance costs—fewer parts will have to be machined because renewals are less frequent.

HSGI
Reg. U. S. Trade Mark

Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished For Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing for Cylinders and Valves
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER MFG. CORPORATION
J.G. Platt, Pres. & Gen. Mgr. V.W. Ellet, Vice-President

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HUNT-SPILLER *Air Furnace* GUN IRON

MODERNIZE TO EFFECT ECONOMIES

Replacement of a mechanical interlocking by a remotely controlled interlocking has resulted in an annual reduction in operating expenses equivalent to 63 per cent of the cost of the changes in the interlocking.

The mechanical interlocking was located at a crossing of a main line of one road with a switch lead of another, the daily traffic being twenty trains on the main line and five round trip trains on the switch lead.

Although the mechanical interlocking was in good condition, it was estimated that because of the physical layout and the character of the traffic, expenses could be considerably reduced by replacing it with power signals and switch machines controlled remotely.

This installation has been in service a year with an annual saving in operating expenses equal to 63 per cent of the cost of the modernization. The entire cost of the changes will be offset in less than another year.

A survey would disclose similar opportunities on many railroads to modernize the signal layouts and thereby reduce operating costs while furnishing efficient transportation service.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, N. Y.

109

History in the Making

The first remotely controlled outlying switch installation was made on the Pennsylvania Railroad in 1901. As of January 1, 1934, there were 929 remotely controlled outlying switches in use in the U. S.